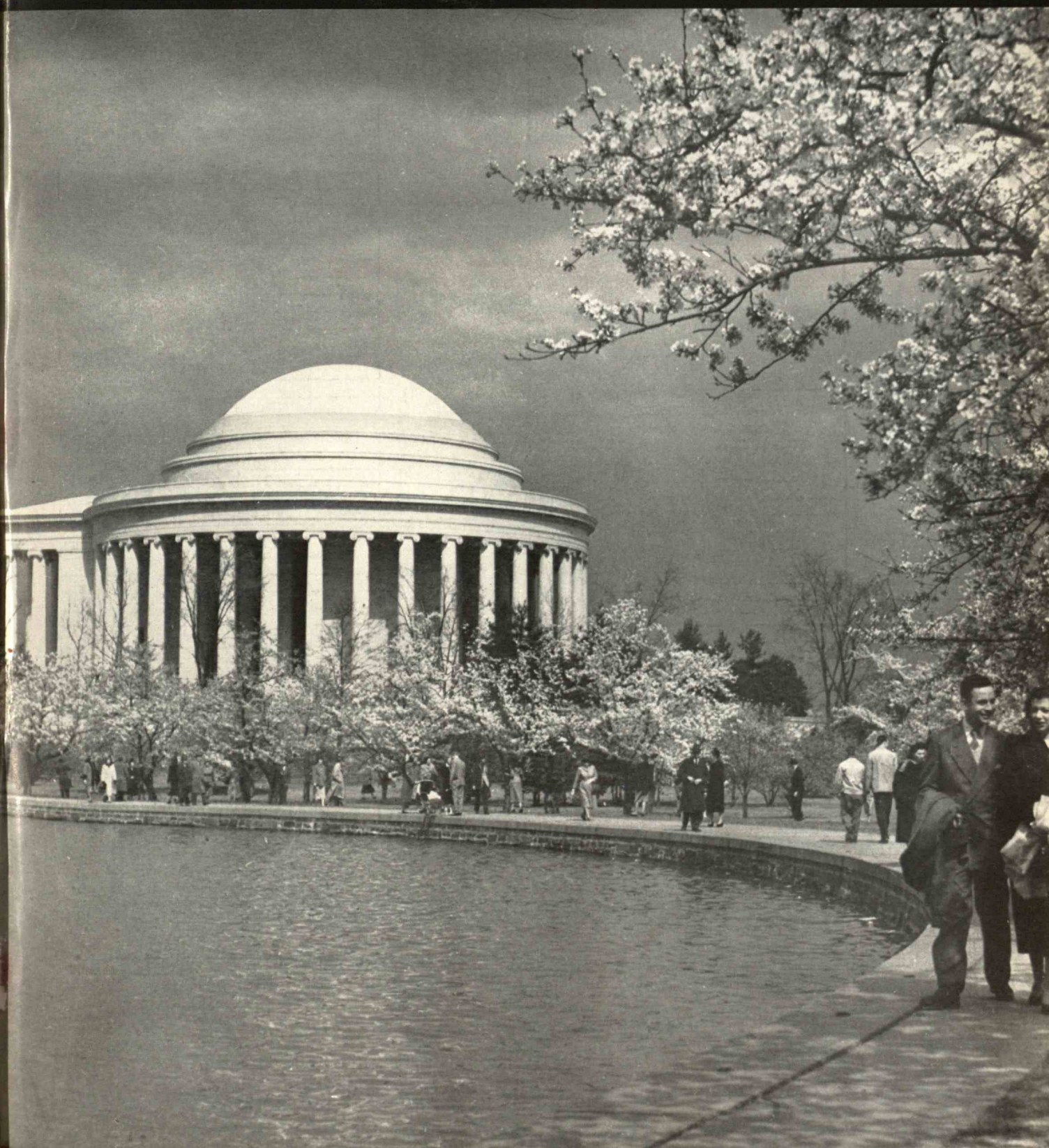


TECHNOLOGY

REVIEW

May 1955

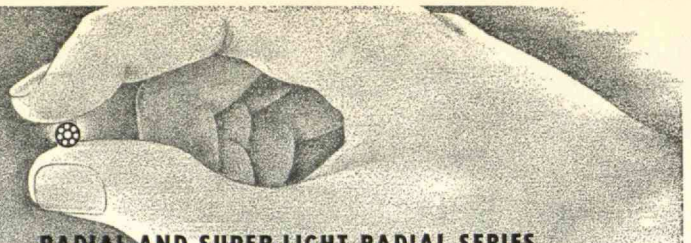


technology review

Published by MIT


This PDF is for your personal, non-commercial use only.
Distribution and use of this material are governed by copyright law.
For non-personal use, or to order multiple copies please email
permissions@technologyreview.com.

MPB miniature ball bearings offer a ready solution to many difficult miniaturization projects involving space, weight and friction.




RADIAL RETAINER SERIES

BEARING NO. BORE O.D. WIDTH


	2 1/2 C	.0469"	.15625"	.0625"
	▼ 3 C	.0550"	.1875"	.0781"
	▼ 4 C	.0781"	.2500"	.0938"
	▼ 5 C	.09375"	.3125"	.1094"
	3332 C	.09375"	.1875"	.0625"
	418 C	.1250"	.2500"	.0938"
	▼ 518 C	.1250"	.3125"	.1094"
	▼ 5532 C	.15625"	.3125"	.1094"
	▼ 5632 C	.1875"	.3125"	.1094"
	▼ 618 C	.1250"	.3750"	.1094"
	▼ 6632 C	.1875"	.3750"	.1250"
	614 C	.2500"	.3750"	.1250"

RADIAL AND SUPER-LIGHT RADIAL SERIES


BEARING NO. BORE O.D. WIDTH

	100	.0250"	.1000"	.0312"
	2	.0400"	.1250"	.0469"
	2 1/2	.0469"	.15625"	.0625"
	▼ 3	.0550"	.1875"	.0781"
	▼ 4	.0781"	.2500"	.0938"
	▼ 5	.09375"	.3125"	.1094"
	3332	.09375"	.1875"	.0625"
	418	.1250"	.2500"	.0938"
	▼ 518	.1250"	.3125"	.1094"
	▼ 5532	.15625"	.3125"	.1094"
	▼ 5632	.1875"	.3125"	.1094"
	5732	.21875"	.3125"	.1094"
	▼ 618	.1250"	.3750"	.1094"
	▼ 6632	.1875"	.3750"	.1250"
	614	.2500"	.3750"	.1250"


FLANGED RADIAL SERIES (Full Race or Retainer Type)

	2 1/2 F	2 1/2 FC	.0469"	.15625"	.0625"
	▼ 3 F	3 FC	.0550"	.1875"	.0781"
	▼ 4 F	4 FC	.0781"	.2500"	.0938"
	▼ 5 F	5 FC	.09375"	.3125"	.1094"
	3332 F	3332 FC	.09375"	.1875"	.0625"
	418 F	418 FC	.1250"	.2500"	.0938"
	▼ 518 F	518 FC	.1250"	.3125"	.1094"
	▼ 5532 F	5532 FC	.15625"	.3125"	.1094"
	▼ 5632 F	5632 FC	.1875"	.3125"	.1094"
	▼ 618 F	618 FC	.1250"	.3750"	.1094"
	▼ 6632 F	6632 FC	.1875"	.3750"	.1250"
	614 F	614 FC	.2500"	.3750"	.1250"


DOUBLE SHIELDED FLANGED RADIAL RETAINER SERIES

	2 1/2 FCHH	.0469"	.15625"	.0938"
	3 FCHH	.0550"	.1875"	.1094"
	4 FCHH	.0781"	.2500"	.1406"
	5 FCHH	.09375"	.3125"	.1406"
	418 FCHH	.1250"	.2500"	.1094"
	518 FCHH	.1250"	.3125"	.1406"
	5532 FCHH	.15625"	.3125"	.1250"
	5632 FCHH	.1875"	.3125"	.1250"
	618 FCHH	.1250"	.3750"	.1406"
	6632 FCHH	.1875"	.3750"	.1250"
	614 FCHH	.2500"	.3750"	.1250"


DOUBLE SHIELDED RADIAL RETAINER SERIES

	2 1/2 CHH	.0469"	.15625"	.0938"
	3 CHH	.0550"	.1875"	.1094"
	4 CHH	.0781"	.2500"	.1406"
	5 CHH	.09375"	.3125"	.1406"
	418 CHH	.1250"	.2500"	.1094"
	518 CHH	.1250"	.3125"	.1406"
	5532 CHH	.15625"	.3125"	.1250"
	5632 CHH	.1875"	.3125"	.1250"
	618 CHH	.1250"	.3750"	.1406"
	6632 CHH	.1875"	.3750"	.1250"
	614 CHH	.2500"	.3750"	.1250"


SEPARABLE SERIES

	3 M	.0550"	.1875"	.0781"
	4 M	.0781"	.2500"	.0938"
	5 M	.09375"	.3125"	.1094"
	518 M	.1250"	.3125"	.1094"
	618 M	.1250"	.3750"	.1094"


THRUST SERIES

	2 T	.0400"	.1250"	.0625"
	4 T	.0938"	.2500"	.0938"
	5 T	.1250"	.3125"	.1250"
	6 T	.1875"	.3750"	.1500"
	7 T	.1250"	.4375"	.1875"

PIVOT SERIES

	1 1/2 PR	.020"†	.0590"	.0472"
	3 PR	.030"†	.1181"	.0709"
	▼ 4 PR	.040"†	.1575"	.0945"
	▼ 5 PR	.050"†	.1968"	.1181"
	▼ 7 1/2 PR	.075"†	.2953"	.1772"
	▼ 10 PR	.100"†	.3937"	.2362"

ANGULAR CONTACT SERIES

	2 A	.042"†	.1250"	.0469"
	3 A	.062"†	.1875"	.0700"
	▼ 4 A	.085"†	.2500"	.0938"
	▼ 6 A	.124"†	.3750"	.1406"
	6 A7B	.150"†	.3750"	.1406"

Prefixes indicate material: Standard is chrome bearing steel (SAE 52100); use no prefix. All bearings, except No. 100 and No. 1 1/2 P, also available in 440 stainless: use prefix SS in ordering. ▼ Indicates also available in 25 beryllium: use prefix NM in ordering. § Indicates sizes available with spring separator, specify suffix S in place of C as shown. † Indicates minimum shaft (S) dimension, (SE) dimension on request. Single Shielded Radial Retainer Series also available, specify CH, dimensions identical to Radial Retainer Series with exception of following which are wider: 2 1/2 CH (.0938), 3 CH (.0938), and 4 CH (.1094). Single Shielded Flanged Radial Retainer Series also available, all dimensions identical to Double Shielded Flanged Radial Retainer Series. Specify FCH and side to be shielded. Grooved Radial Retainer bearings are also available in 9 sizes. Root diameter of groove is the same as O.D. of equivalent Radial bearing. Details on request.

MPB ball bearings

are available in ten design series and in more than 400 different types and sizes which normally can be supplied from stock for prompt installation.

Instrument manufacturers and users of small precision mechanisms can now utilize all the well known extra advantages of anti-friction bearings (accurate alignment, long wear, freedom from attention) universally accepted in larger quality equipment.

For more than 20 years MPB ball bearings have contributed to the successful operation of precision mechanisms. A pioneer in designs and

dimensions now being internationally standardized, MPB has also originated many precision manufacturing techniques. All MPB ball bearings are ground, lapped, honed and/or burnished in accordance with highest quality practice for optimum operating characteristics. Inspection limit tolerances are equal to ABEC 5 or better.

The most extensive engineering knowledge in miniature bearing applications is available to you. More than a million MPB ball bearings have been installed in precision mechanisms. Catalog 54 giving complete specifications, and additional data sheets mailed to you on request.

Miniature Precision Bearings

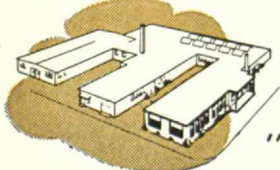
Incorporated



Keene, New Hampshire

"Pioneer Precisionists to the World's Foremost Instrument Manufacturers"

save
space
weight
friction

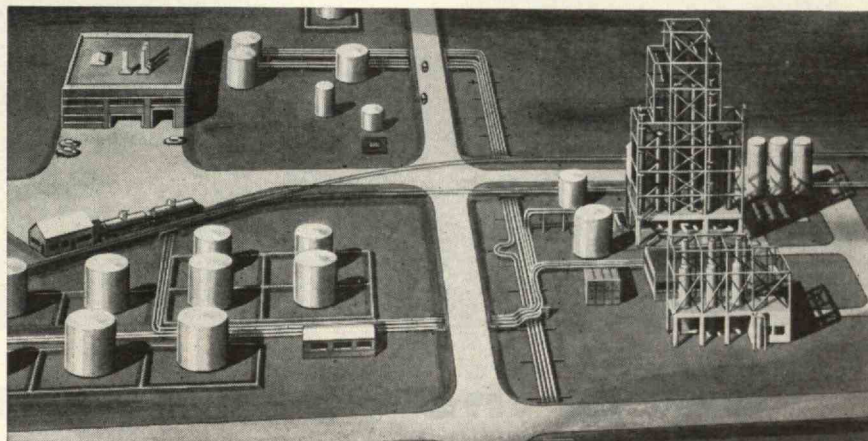


LUMMUS TO BUILD AIR REDUCTION CHEMICAL'S VINYL ACETATE PLANT AT CALVERT CITY, KENTUCKY

Lummus-Built Plant To Come On Stream In Early 1956

The 30,000,000 lb. per year vinyl acetate plant which The Lummus Company is engineering and constructing for Air Reduction Chemical Company, a division of Air Reduction Company, Inc., is a good example of how industry can set up an integrated plant in a strategic location, and insure maximum returns for its capital investment. The plant's attractive location at Calvert City, Kentucky has all the benefits of readily available power, natural gas, water transportation, and a host of related chemical products.

This \$3,000,000 installation scheduled for completion early in 1956, is adjacent to the calcium carbide and acetylene plant of Air Reduction's National Carbide Division, and will receive pipeline acetylene from it. The new vinyl acetate plant will be a key develop-



ment in Air Reduction's chemical expansion which begins with basic raw materials and ends with a variety of products having important commercial and industrial uses.

Vinyl acetate goes principally into polyvinyl acetate emulsions, used in adhesives, latex paints and textile finishes, and polyvinyl alcohol used for adhesives and textile finishes.

At Calvert City, in addition to this new Air Reduction plant, Lummus is also building a \$6,000,000 high pressure acety-

lene derivatives plant for General Aniline & Film Corporation. What better example could be given to show that Lummus is ready, willing and able to design, engineer and construct your next chemical plant.

The Lummus Company, 385 Madison Avenue, New York 17, N. Y. **Engineering & Sales Offices:** New York, Houston, Montreal, London, Paris, The Hague, Bombay. **Sales Offices:** Chicago, Caracas. **Heat Exchanger Plant:** Honesdale, Pa. **Fabricated Piping Plant:** East Chicago, Indiana.

LUMMUS



Out of the desolate, flat land . . .

at Tuscola, Illinois, there has grown the giant plant of the National-Petro Chemicals Corporation, manufacturer of ethylene and many of its by-products.

Necessary to this installation is sufficient storage capacity to handle the materials used in its many processes. The tanks pictured above are part of more than 2,000,000-gallon storage capacity built by Graver. They contain sulfuric acid—an

essential ingredient in the manufacture of ethyl alcohol from ethylene.

Graver is especially qualified to build special-purpose tanks like these at Tuscola, and also fabricates storage tanks of every size for all industrial needs. For 97 years Graver has been building tanks. . . You can do no better than to supply your requirements from this experienced and dependable source.



... builds storage tanks for every need

GRAVER TANK & MFG. CO., INC.

East Chicago, Indiana

CHICAGO • NEW YORK • PHILADELPHIA • EDGE MOOR, DEL. • ATLANTA • CATASAUQUA, PA. • PITTSBURGH
CLEVELAND • DETROIT • TULSA • SAND SPRINGS, OKLA. • HOUSTON • ODESSA, TEXAS • CASPER, WYO.
LOS ANGELES • FONTANA, CAL. • SAN FRANCISCO

Now—an entirely new kind of signal cable!

PHELPS DODGE SPIRAFIL COAXIAL CABLE

**with exceptional
Community Antenna System
characteristics**

PHELPS DODGE SPIRAFIL CABLE 3/8 70Ω

Spirafil coaxial signal cable was developed by Phelps Dodge as a companion cable to Styroflex coaxial cable. It is designed for specific use in applications where the precise Styroflex tape helix construction is not required.

This unique signal cable is made up of a solid copper center conductor, a solid polyethylene helix and an outer, tubular aluminum conductor.

Spirafil cable is particularly adaptable to use in community antenna systems. For this purpose, it has a number of outstanding features—*no radiation, low attenuation, excellent frequency response, uniform electrical properties over wide temperature variations and unlimited operating life.*

Spirafil cable is one of that select group

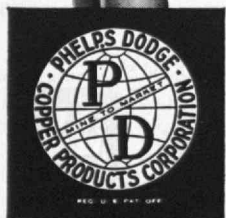
of cables assigned the highest life expectancy rating.

These special Spirafil characteristics, together with the economical cost of the cable, also make it suitable for certain applications in VHF, UHF and microwave communications circuits.

Spirafil cable is manufactured in 1000-foot, continuous lengths without joints. A Habirlene (polyethylene) jacket is supplied for protection against corrosion when the cable is to be installed in underground ducts, under water, or buried directly in the ground.

★ ★ ★

For special bulletin describing new Spirafil coaxial cable, write Dept. TR.



PHELPS DODGE COPPER PRODUCTS CORPORATION

40 WALL STREET, NEW YORK 5, N. Y.

"Give me where
to stand
and I will
move the earth"



In the roster of the glorious Greeks, Archimedes stands with the greatest. For he laid out the systems of dynamics . . . the science of bodies in motion . . . and laid the foundations of Mechanical Engineering.

Today, the Mechanical Engineer's concern with dynamics leads him into every aspect of our industrial and domestic lives. He helps produce our automobiles, our clothing, our magazines . . . our electric power and our locomotives. He gives us all a far better life—and helps plan an even brighter future.

Because this vital profession is so far-reaching, no one man can encompass every part of it. Acting as storehouse of this accumulated knowledge—and spearheading the critical task of achieving tolerable systems of *standards* in such varied things as bolts, belts and boilers—is his society, the American Society of Mechanical Engineers.

This year, the A.S.M.E. is seventy-five years old. Of its fine record of achievement, it can be justly proud. And Combustion Engineering—which for generations has been benefited by, and in some measure has contributed to, the work of the society—is delighted to wish the A.S.M.E. a happy diamond anniversary.

B-818B

COMBUSTION ENGINEERING

Combustion Engineering Building
200 Madison Avenue, New York 16, N.Y.



New *airborne* silica

**See how the remarkable properties of
this different silica work together
to perform unusual functions for you**

Here's a different silica – different because it is prepared in a hot gaseous environment and not by an aqueous precipitation process.

This vapor method, where "airborne" silica particles are formed *almost instantly*, gives CAB-O-SIL®:

HIGH CHEMICAL PURITY

EXTREMELY FINE PARTICLE SIZE

ENORMOUS EXTERNAL SURFACE AREA

HIGH PARTICLE SEPARATION

EASY DISPERSION

UNUSUAL OPTICAL PROPERTIES

Useful as these properties are it is often a *combination of two or more of these characteristics acting together* that accounts for CAB-O-SIL's unusual behavior. Startling improvements in products

and processes – not possible with precipitated silicas, silica gels and silica aerogels – are realized with this versatile new particulate silica.

New fact-filled bulletins tell how CAB-O-SIL gives superior performance in such important functions as:

A Reinforcing Agent
A Suspending Agent
A Flatting Agent
A Thixotropic Agent
A Thickening and Gelling Agent
An Anticaking Agent
An Antislip Agent
A Transparent Extender

Send for facts and sample now. You'll discover that unusual jobs are being performed by this new colloidal silica that may apply to

your industry. You'll see that many functions require surprisingly small quantities of CAB-O-SIL to keep improvement costs down. Commercial quantities are continuously available.

Chemical and Physical Properties

Silica Content (Moisture-Free Basis)

	99.0 – 99.7%
Free Moisture (105° C.)	0.2 – 2.0%
Ignition Loss (1000° C.)	0.2 – 1.0%
CaO, MgO	0.00%
Fez Os	0.004%
Particle Size Range	.015 – .020 micron
Surface Area (Nitrogen Adsorption)	175 – 200 m. ² /gm.
Specific Gravity	2.1
Color	white
Refractive Index	1.55
pH (10% Aqueous Dispersion)	4.5 – 6.0

Oil Absorption (Gardner Method)
150 lbs. oil/100 lbs. pigment

Bulking Value 0.057 gal./lb.

Apparent Bulk Density
Uncompressed Grade 2.5 – 3.5 lbs./cu. ft.
Compressed Grade 6.0 – 6.5 lbs./cu. ft.



Since 1882,
manufacturers of chemicals.
Cabot products include Carbon Blacks;
Plastics Chemicals; Pine Tar Products;
Dipentene; Charcoal; Coke;
Cab-o-sil; Wollastonite; Alon C;
Garnet; Kaolin; Natural Gas;
Natural Gasoline; Gun Tubes;
Oil Well Pumping Equipment.

Free CAB-O-SIL® FACTS AND SAMPLE

WHITE PIGMENTS DIVISION CP,
GODFREY L. CABOT, INC.
77 FRANKLIN ST., BOSTON 10, MASS.

Name _____
Title _____
Company _____
Address _____

Please send CAB-O-SIL sample and:

- ☐ CGen-1 General Properties, Functions and Uses
- ☐ CMis-1 Cab-o-sil in Rubber
- ☐ CMis-2 Aqueous Dispersions of Cab-o-sil
- ☐ CPai-1 Cab-o-sil as a Transparent Extender for Automotive Enamels
- ☐ CPai-2 Cab-o-sil in Paints
- ☐ CPai-3 Cab-o-sil as a Flatting Agent for Varnishes
- ☐ CPLa-1 Cab-o-sil in Polyester-Glass Reinforced Plastics
- ☐ CPLa-2 Cab-o-sil in Plastics

Get in touch with



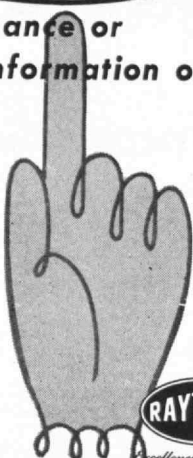
for product, performance or
application information on . . .

SEMI-CONDUCTOR
TRANSISTORS AND DIODES

TUBES
MINIATURE*
NUCLEONIC
RECTIFIER
RUGGED
SUBMINIATURE*

TRANSMITTING
VOLTAGE REFERENCE*
VOLTAGE REGULATOR*

* Many types available to military specifications for Reliable Tubes



RAYTHEON MANUFACTURING COMPANY

Receiving Tube Division — Home Office:
55 Chapel St., Newton 58, Mass. Bigelow 4-7500
For Application Information Write Or Call The Home Office Or:
9501 Grand Avenue, Franklin Park (Chicago), Ill., TUXedo 9-5400
589 Fifth Avenue, New York 17, New York, PLaza 9-3900
622 South La Brea Ave., Los Angeles 36, California, WEbster 8-2851



GEARS

**Made to Your
Specifications**

You and we can form a team—you to draw up the specifications; we to make the gears—that will be profitable to both of us. Gears of all types, all sizes, all materials. Design-engineering service available.

Custom Gears
Exclusively

**DIEFENDORF GEAR
CORPORATION**
Syracuse 1, N. Y.

DIEFENDORF
GEARS

THE TABULAR VIEW

Mainstay Meals.—Despite a vast, fertile land millions of square miles in extent, the early pioneers who settled on the Atlantic shores—whether at Boston, Plymouth, New Amsterdam, Jamestown, or St. Augustine—had to labor long, diligently, and skillfully to assure an adequate and dependable food supply. They were at the mercy of the vagaries of the weather and of the peacefulness of the Indians. They had no power machinery and had to import all but the few products they could build themselves in their local communities. The diet of these hardy settlers left much to be desired, according to modern standards, but they thrived, grew strong, and—building on individual freedom and initiative—carved a great nation out of the wilderness. How—and what—our ancestors ate is treated in the article "Food of Our Colonial Forefathers" (page 343) by HARRY W. VON LOESECKE. A graduate of Harvard University, Mr. von Loesecke was formerly research chemist for the General Electric Company, the American Protein Corporation, and the United Fruit Company. He has also been senior chemist, industrial specialist, and technical adviser in a variety of projects related to agriculture and the food industry. Mr. von Loesecke is a fellow of the American Public Health Association, and this year is chairman of its Food and Nutrition Section. He is a member of the American Chemical Society, and of the Institute of Food Technologists.

Iron Idyl.—Most of the high-grade iron deposits in areas within easy accessibility of major markets have long since been discovered and, if profitable, have also been developed. Lower-grade ore deposits are next to be developed, but occasionally a rich deposit in an out-of-the-way place is discovered. When this happens, much engineering effort and talent must be directed to the task of bringing the iron to salable markets. How this was done in the case of a rich deposit in Cerro Bolivar is described in "Iron Ore from Cerro Bolivar" (page 339) by RICHARD FINNIE. Historian of the world-wide Bechtel
(Concluded on page 324)

ALUMNI DAY, 1955

June 13 at M.I.T.

Emphasizing the Morning Conference—
"Uses and Economics of the Peaceful Atom"

Panel Participants:

JOHN VON NEUMANN, Commissioner, Atomic Energy Commission

DR. SHIELDS WARREN, Professor of Pathology, New England Deaconess Hospital

T. KEITH GLENNAN, President, Case Institute of Technology

Moderator:

EDWARD L. COCHRANE, '20, Vice President for Industrial and Governmental Relations, M.I.T.

Alumni Luncheon
Du Pont Court, M.I.T.

Alumni Banquet
Hotel Statler, Boston

ALLOY STEELS PAY OFF

CASE HISTORIES INDEX

CASE HISTORY NO.	ALLOY	STEEL	CASE HISTORY NO.	ALLOY	STEEL
1	AIR TRUCK STEEL	ON COAL WARRING	31	MOLLENT STEEL ROD	
2	ANCHOR CHAIN		32	HOUSING CASES	
3	APPROVED BEINGS		33	POI-WATER TANKS	
4	BILL CASE	ON LANTERN JONES	34	HYDRAULIC TURBINES	
5	BANK BAYS		35	INDUSTRIAL SCREENS	
6	BOLTS		36	INDUSTRIAL SCREENS	
7	BOWING BARS		37	INDUSTRIAL SCREENS	
8	BROOKS		38	SHIELDS FOR PULVERIZER CYLINDERS	
9	BROOKS FOR PULVERIZER CASE		39	LOW-MODERATE PRESSURE	
10	CABLE TOOL AND		40	ONE CASE AND ONE TRUCKS	
11	CAUSTIC EVAPORATORS		41	CHIMNEY HEADING LINES	
12	CENTRAL STATION		42	ONE AND COAL CHUTES	
13	CLARK AND IN		43	ONE AND SCRAPERS	
14	CHUTES AND PIG BOWLS		44	OVERHEAD TRAVELING CRANES	
15	CHRISTIAN TRUSS		45	PITMAN CARS	
16	CLUTCH SPRINGS		46	POLY LINE HARDWARE	
17	COAL CUTTER BARS		47	POWER SHOVELS	
18	COLLAPSE BONES		48	PRESSURE VESSELS	
19	CONCRETE CHAMBERS OF		49	RAILROAD PASSENGER	
20	COMPRESSED-GAS CYLINDERS		50	RAILROAD PASSENGER	
21	CONVEYORS		51	RAILROAD PASSENGER	
22	CULIVATORS		52	RAILROAD PASSENGER	
23	DAVEY BOWS		53	RAILROAD PASSENGER	
24	DEPARTMENT IN CONTACT		54	RAILROAD PASSENGER	
25	DEPARTMENT IN CONTACT		55	RAILROAD PASSENGER	
26	DEPARTMENT IN CONTACT		56	RAILROAD PASSENGER	
27	DEPARTMENT IN CONTACT		57	RAILROAD PASSENGER	
28	DEPARTMENT IN CONTACT		58	RAILROAD PASSENGER	
29	DEPARTMENT IN CONTACT		59	RAILROAD PASSENGER	
30	DEPARTMENT IN CONTACT		60	RAILROAD PASSENGER	

60 fully documented case histories

Facts on maximum pay load

Facts on lower operating costs

Facts on lower corrosion rate

Facts on toughness, wear, strength

CLIMAX MOLYBDENUM COMPANY, Dept. U
500 Fifth Avenue, New York 36, N. Y.

Please send me the 208-page handbook
"Alloy Steels Pay Off"

Name _____

University _____

School _____

Address _____

MAIL
THIS TODAY

If you're working for an
engineering degree, here's the
handbook you should have



This fact-packed handbook is a must if you are studying engineering. Here, with complete engineering data, you'll find how the use of alloy steels adds economies, increases service life, offers many other advantages.* It contains a valuable section on costs that you will

find most important because it spells out the economies of alloy steel. Design and metallurgical engineers now in industry have found the 60 case histories showing the advantages of alloy steels interesting and instructive. You will find this entire book to be an excellent reference for thesis projects and a valuable tool after you graduate. Send for your free copy. Climax Molybdenum Company, 500 Fifth Avenue, New York 36, New York.

MUS-19

* Advantages of ALLOY STEELS

- longer life
- greater pay load
- lower operating costs
- greater safety
- less maintenance

CLIMAX MOLYBDENUM



DC-AC CHOPPERS

For 60 Cycle Use

Built to rigid commercial specifications.

Twenty-two types, both single and double pole.

Long life.

Low noise level.

Extreme reliability.

Write for Catalog 370.

**STEVENS
INCORPORATED
ARNOLD**

22 ELKINS STREET
SOUTH BOSTON 27, MASS.



S/A-10



Write for Free Brochure on:

- Piling • Pile Shells • Pile Fittings
- Prefabricated Piping
- SPEED-LAY System



ALBERT pipe supply co., inc.
BERRY AT NORTH 13TH ST. • BROOKLYN 11, N. Y.

S. G. Albert '29

THE TABULAR VIEW

(Concluded from page 322)

engineering and construction interests since 1942, Mr. Finnie is author of several books and innumerable magazine articles on construction projects. He has photographed, written, and produced more than a dozen documentary sound-and-color films on major construction projects at home and abroad. His article in this issue is an adaptation of the commentary for his film "Iron Ore from Cerro Bolivar." Mr. Finnie is well known to Review readers for his articles "American Technology in Arabian Oil Lands" (December, 1951) and "Alaska and the Engineer" (June, 1945).

Textile Tycoon.—Historians generally consider the factory system in this country to have had its origin in December, 1790, when the cotton spinning mill of Almy, Brown, and Slater went into operation beside Pawtucket Falls, Pawtucket, R.I. The mill was, in very large measure, the product of the perseverance, energy, and engineering skill of Samuel Slater who, after having served as apprentice in English cotton factories (where Richard Arkwright's spinning machines were used) came to this country at the age of 21 and established himself as pioneer in the textile industry. The part which Samuel Slater assumed in building up New England's textile industry is ably told in the article "The Genius of Samuel Slater" (page 333) by E. H. CAMERON, '13, frequent contributor to The Review on items of historical technology. It will interest Review readers to be reminded that M.I.T. has its Slater Textile Laboratory named for this distinguished textile tycoon. It is also interesting to learn that the Old Slater Mill in Pawtucket is to be opened this year as a museum of textile technology. Finally, Review readers may anticipate, in the undesignated future, a book on the life of Samuel Slater—manuscript of which is being prepared by Mr. Cameron.



McKesson & Robbins, Inc.
Chapman, Evans & Delehanty,
Architects

Profitable Venture

You erect a new factory because you believe it will pay. Make it a profitable venture from the very start by engaging a builder who can build it quickly and with money-saving efficiency.

*We have specialized in industrial
construction for 38 years.*

W. J. BARNEY CORPORATION

Founded 1917

101 Park Avenue, New York

Alfred T. Glassett, '20, President

This is just one of the many fields in which Union Carbide offers CAREERS WITH OPPORTUNITY



... why they spell a better life for you

A CENTURY AGO, pioneering scientists learned to take apart water, air, and earth and put them together again ... in completely different arrangements.

THE RESULT, very often, was a *synthetic*—a brand new material that didn't exist in nature, or a more abundant, more useful version of a nature-made product. Thus, through the years, synthetic has come to mean 'man-made and well-made.'

Science has developed nearly half a million synthetic materials since that time, and millions more are possible.

WHERE DO SYNTHETICS fit into your life? Nearly everywhere! The aspirin you take for a headache, the life-saving sulfa drugs and scores of other modern medicines are synthetics. So are today's remarkable plastics, new textiles, and many paints, dyes, adhesives, and valuable chemicals.

AN IMPORTANT PART of the work of the people of Union Carbide is discovering and producing synthetic materials that serve you and industry. From natural gas and oil, alone, they produce nearly 400 chemicals. Among them are chemicals that are vital to everything from synthetic rubber to cosmetics ... and to the variety of plastics and resins made by UCC, which are used in nearly every home and industry today.

STUDENTS AND STUDENT ADVISERS: Learn more about career opportunities with Union Carbide in **ALLOYS, CARBONS, CHEMICALS, GASES, and PLASTICS.** Write for booklet C-2.

UNION CARBIDE
AND CARBON CORPORATION

30 EAST 42ND STREET **UCC** NEW YORK 17, N. Y.

In Canada: UNION CARBIDE CANADA LIMITED

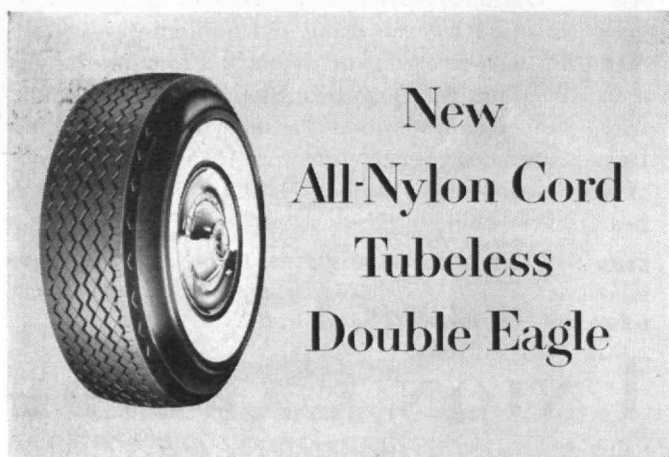
—UCC's Trade-marked Products include—

SYNTHETIC ORGANIC CHEMICALS PRESTONE Anti-Freeze
Dynel Textile Fibers ELECTROMET Alloys and Metals
LINDE Silicones BAKELITE, VINYLITE, and KRENE Plastics

EVEREADY Flashlights and Batteries PREST-O-LITE Acetylene
HAYNES STELLITE Alloys UNION CARBIDE LINDE Oxygen
NATIONAL Carbons ACHESON Electrodes PYROFAX Gas



You don't really need a tire this good



New
All-Nylon Cord
Tubeless
Double Eagle

Beyond doubt, this tire complements today's modern cars.

The new All-Nylon Cord Tubeless Double Eagle belongs on your car, too, if you want above all else the satisfaction of knowing you are riding on the finest tire that men can make or money can buy. For it's highly unlikely that you will keep your car long enough to wear out the All-Nylon Cord Tubeless Double Eagle, or come close to testing its extraordinary strength and protection.

And it's pleasant to know that your tire offers an extra-wide margin of blowout and puncture protection because it's made with Goodyear's exclusive 3-T Nylon Cord and Grip-Seal construction. Also gratifying are the superior mileage of its deeper, tougher tread and the safety of its Resist-a-Skid tread design.

Why not see your Goodyear dealer? Goodyear, Akron 16, Ohio.

MORE PEOPLE RIDE ON GOODYEAR TIRES THAN ON ANY OTHER KIND!

GOODYEAR
The world's finest tire...by miles!

Double Eagle, T. M.—The Goodyear Tire & Rubber Company, Akron, Ohio

THE TECHNOLOGY REVIEW

TITLE REGISTERED, U. S. PATENT OFFICE

EDITED AT

THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY



Enerett K. Harstad

Editor:

B. DUDLEY

Business Manager:

R. T. JOPE

Circulation Manager:

D. P. SEVERANCE

Editorial Associates:

PAUL COHEN
J. R. KILLIAN, JR.
F. W. NORDSIEK
J. J. ROWLANDS

Editorial Staff:

RUTH KING
EVANGELINE SFERES

Business Staff:

EILEEN E. KLIMOWICZ
MADELINE R. MCCORMICK

Publisher:

H. E. LOBDELL

VOL. 57, NO. 7

MAY, 1955

CONTENTS

JEFFERSON MEMORIAL, WASHINGTON, D. C.

PHOTOGRAPH BY RAYMOND E. HANSON THE COVER

MOORLANDS, ROCK HARBOR, ORLEANS, MASSACHUSETTS

PHOTOGRAPH BY RAYMOND E. HANSON FRONTISPIECE 328

THE GENIUS OF SAMUEL SLATER BY E. H. CAMERON 333

The talents and initiative of a British born textile worker came to flower in the United States as Slater mills first sprang up in New England more than a century ago

IRON ORE FROM CERRO BOLIVAR BY RICHARD FINNIE 339

Iron is where you find it, but it often takes a great deal of engineering talent, construction, and administrative ability to get it where you need it

FOOD OF OUR COLONIAL FOREFATHERS

BY HARRY W. VON LOESECKE 343

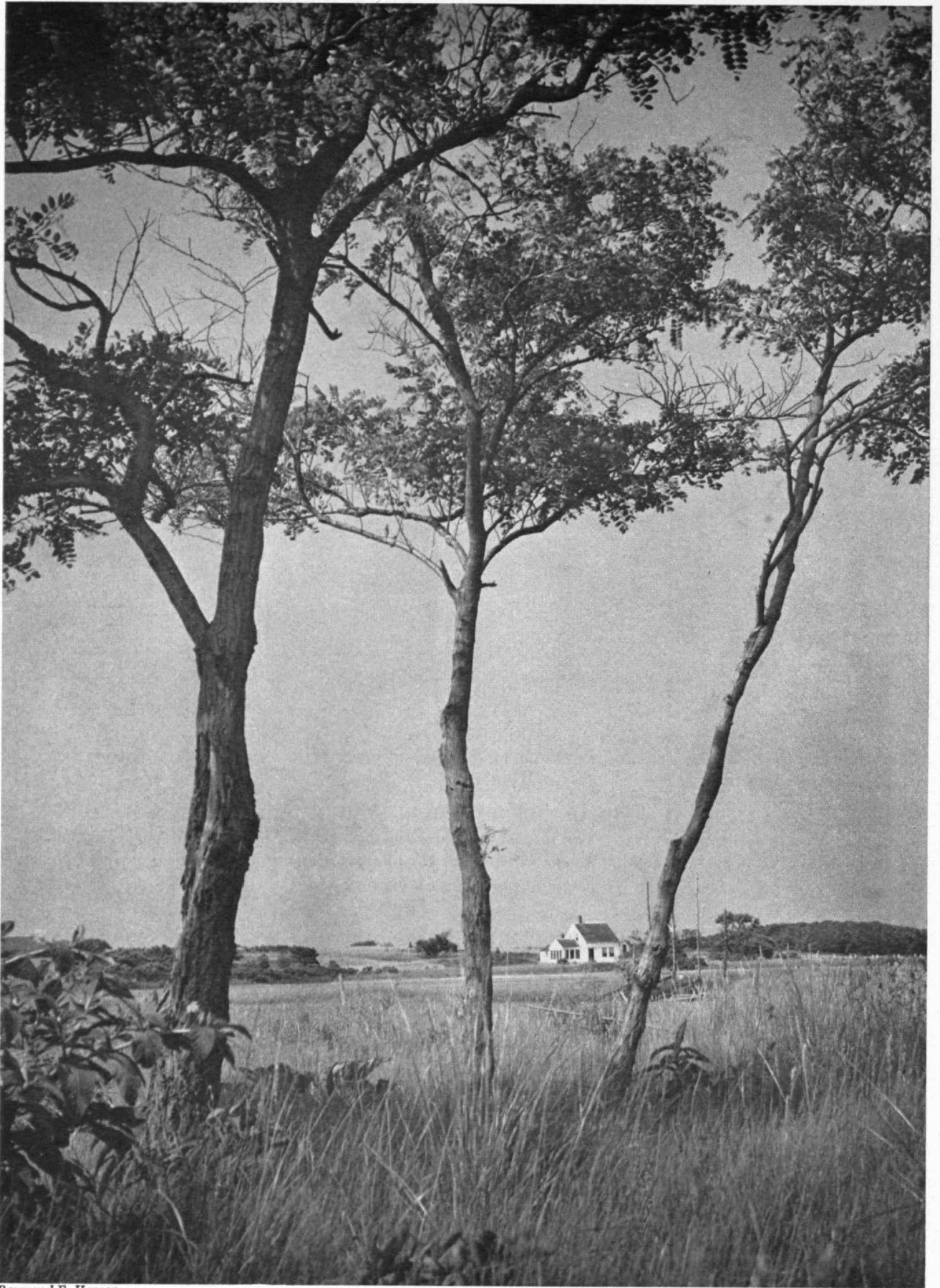
Although sometimes plagued by hunger and crop failures, the colonists thrived on their limited diet and would have stood aghast at the idea of a price-support program for farmers

THE TABULAR VIEW • Contributors and Contributions 322

THE TREND OF AFFAIRS • News of Science and Engineering .. 329

THE INSTITUTE GAZETTE • Relating to the Massachusetts Institute of Technology 347

Published monthly from November to July inclusive on the twenty-seventh of the month preceding the date of issue, at 60 cents a copy. Annual subscription, \$4.00; Canadian and foreign subscription, \$4.50. Published for the Alumni Association of the M.I.T.: Hugh S. Ferguson, President; H. E. Lobdell, Executive Vice-president; Richard S. Morse, Gilbert M. Roddy, Vice-presidents. Donald P. Severance, Secretary-Treasurer. Published at Hildreth Press, Inc., Bristol, Conn. Editorial Office, Room 1-281, Massachusetts Institute of Technology, Cambridge 39, Mass. Entered as second-class mail matter at the Post Office at Bristol, Conn. Copyrighted, 1955, by the Alumni Association of the Massachusetts Institute of Technology. Three weeks must be allowed to effect change of address, for which both old and new addresses should be given.



Raymond E. Hanson

Moorlands — Rock Harbor, Orleans, Massachusetts

THE TECHNOLOGY REVIEW

Vol. 57, No. 7



May, 1955

The Trend of Affairs

Sedulous Ape

Now that a simian performer named J. Fred Muggs is a leading television star, the time has come for reassessment of the cultural potentialities of the anthropoid apes. Rather than comparing the intellect of Mr. Muggs with that of his fellow artists (lest the results be invidious to human beings) let us consider the attainments of a chimpanzee in private life — one Viki, who from her birth until an age of over six years lived in Florida with two scientists who were husband and wife. For the purposes of a behavior study, these people undertook to nurture the ape as much as possible like a human youngster.

At the age of six, Viki is reported to have employed a primitive form of speech, consisting of six clearly differentiated sounds, made entirely with her mouth, without use of the lungs or larynx. (Speech sounds of this nature are said to occur among primitive peoples.) Viki mastered meanings assigned to these sounds by her human guardians, not by herself. She employed this speech only to attain her needs or wants in the way of food, drink, comfort, or amusement. Speech was, however, a measure of last resort for Viki, because if possible she gained her ends silently, by leading someone to the necessary place and demonstrating what she wanted — either by handling objects or by guiding the human hand into the action she wanted performed. If these measures were unavailing, and if her desire happened to be one of the six that had been assigned to her limited speech sounds, the chimpanzee then finally expressed herself orally.

Thus Viki engaged in social activity to the extent that she enlisted the aid of human beings to do things she was unable to do, was afraid to do, or was forbidden to do. She respected authority by refraining

from forbidden actions; but did not hesitate to get human beings to do things she was forbidden to do herself.

This chimpanzee also employed symbolism of a crude sort. For example, whenever her preceptors took her for an automobile ride before she was housebroken, they brought along a supply of diapers. This practice led Viki to develop, on her own initiative, the bringing of a handful of diapers as an indication that she wanted a ride. Later on, after she was housebroken and diapers were no longer kept around, she substituted the fetching of some paper facial tissues as expression of the desire for an automobile trip.

Viki was able to stand and to walk upright, and to carry heavy burdens clasped in her forelegs short distances while walking on her hind legs. She employed a variety of tools, such as spoons and pliers, and had no trouble working the lighter she used to light the cigarettes of which she was fond.

Viki's passion for tobacco brings us to what is perhaps the salient observation of this study. While smoking, the ape grasped her cigarettes delicately between the tips of thumb and forefinger. The ability to hold objects in this fashion, called "the opposable thumb" has been held by some anthropologists to be anatomically unique to the human being, and indeed to be a prime point of differentiation between man and the higher apes. The opposable thumb has in fact been considered to be the basis for the human use of delicate tools, including writing implements, and thus to be the foundation for mankind's climb up the developmental ladder. Viki's manual skills tend to negate these concepts.

Further doubt that the opposable thumb is a valid dividing line between men and apes comes from photographically recorded observations of Balinese children and adults by the anthropologists Mead and Macgregor. These pictures show that Balinese chil-

dren during the first several years of life do not use their thumbs in opposition to their forefingers. (American children usually develop this skill by the age of one year.) Thus when the Balinese youngsters grasp an object the thumb may either be nonfunctional, or else fall on the same side of the object as the remaining fingers. Although the Balinese in time learn to employ opposed tips of thumb and forefinger, even as adults they tend to use the entire hand in manipulations, and never come to depend upon the opposable thumb as Americans do.

Thus it appears from observations of both apes and men that the opposable thumb, and the delicate manipulations it makes possible, are cultural attainments rather than inherent anatomical characteristics. Therefore it might be possible to train higher apes to have substantial manual skills. If apes continue to flourish as television entertainers, perhaps they may in time be able to endorse their own salary checks.

Ductile Cast Iron

CAST iron is an interesting member of the family of casting alloys. Although an unglamorous stepchild in the family of cast metals, it is rivaled only by wrought steel in the tonnages used annually. In spite of such wide use it is too glass-like and brittle for strategic military use or critical peacetime engineering application. Seemingly, cast iron appears to be the simplest of the ferrous metals to make, but in reality it is metallurgically the most complex. It is

both the least expensive of all casting alloys and potentially the most versatile.

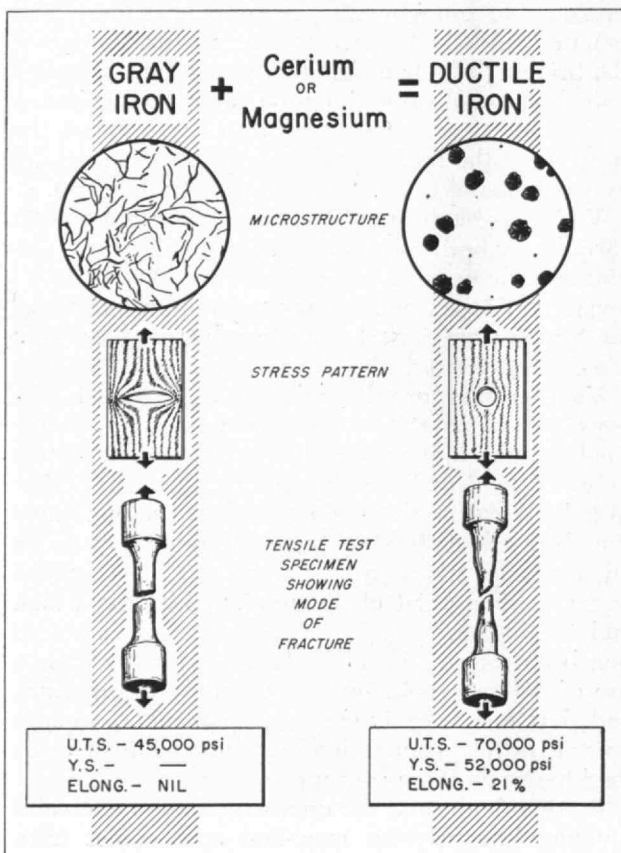
Relatively neglected in the research laboratories of America for hundreds of years, cast iron is finally commanding the interest due its venerable ancestry. This increased interest comes about because it is now possible to convert the brittle, gray cast iron to ductile iron with mechanical properties rivaling those of steels. This striking metallurgical development is new and a full appraisal is impossible to make at the present time. This appraisal is part of the job undertaken by the M.I.T. Metals Processing Laboratory during the last five years.

The engineer has long recognized that the plate-like flakes of graphite in ordinary gray iron limited its strength and caused its innate brittleness. Thus he has sought a means for causing the graphite to assume a more favorable form. Invention of "black-heart malleable iron" (in which the graphite forms rosette-like nodules less damaging to ductility than flakes) was a step in this direction. Production of malleable iron requires a base metal of relatively limited composition and a very lengthy heat treatment; also, malleable iron castings are limited to use for castings of relatively small sizes and thin sections. The engineer dreamed of an iron whose structure contained spheres rather than flakes of graphite; he preferred an iron that would form the spheres during freezing, or with a simple, short heat treatment.

In 1948, the dream came true when English and American metallurgists disclosed simultaneously the means for making "spherulitic" or "ductile" iron by two different processes. The British technique involved treatment of low-sulphur, hyper-eutectic iron with cerium (misch metal); the American development employed magnesium for treating either hypo- or hyper-eutectic irons. Properly applied under favorable (but commercially practical) conditions, each process transformed the flakes of ordinary gray iron into spherulites. This amazing result was obtained as if by magic with essentially only a pinch of cerium or magnesium. Even though magnesium boils at the temperature of molten iron, it was only necessary to find a technique for retaining from 0.02 to 0.10 of 1 per cent magnesium to do the job.

In 1950, M.I.T. and the Watertown Arsenal realized the potential technological use of ductile iron was great and that a completely adequate basic understanding of its properties was lacking. Accordingly, research was initiated to assess the potentialities of ductile irons by developing an understanding of the range of properties producible with different compositions and different metallurgical structures. One aim of such research was to enable the Army and industry to best produce and utilize this new engineering tool. Research work at M.I.T. has been conducted by Charles C. Reynolds, '47, and Howard F. Taylor, 2-46, Professor of Metallurgy.

Work has been completed on many of the engineering phases of the investigation and current work of this type centers on problems of solidification shrinkage and risering. Research is being done continuously on the more scientifically interesting problems, such as mechanism of formation of graphite in flake and spherulitic irons, primarily as thesis sub-



George W. Schmidt, Jr.

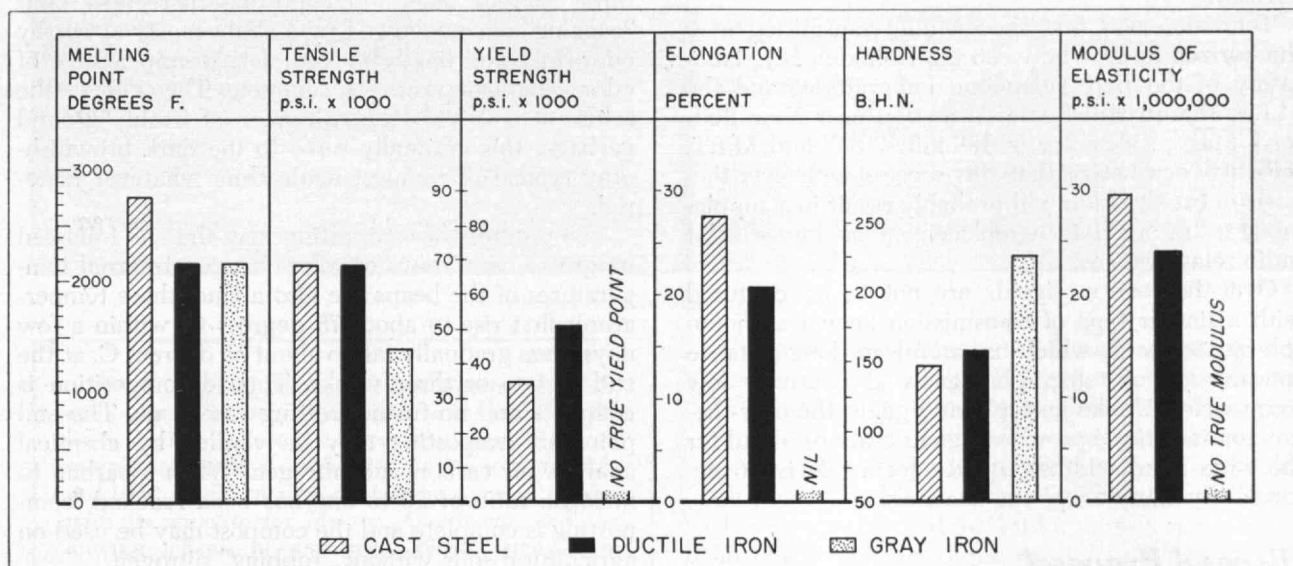
Small quantities of cerium or magnesium, added to gray iron, produce dramatic changes in its properties.

jects by candidates for master of science and doctor's degrees.

Work completed to date permits some tentative conclusions to be made of possible interest in assessing the future position of ductile iron in the family of cast ferrous alloys: (1) ductile iron can be made dependably in all types of melting units normally used for melting gray iron (including the induction furnace), and control of processing variables is commercially fully practical; (2) compared to gray iron, ductile iron has far superior strength, ductility, and toughness, twice the modulus of elasticity, better machinability for equal hardness, and equal fluidity; (3) compared to cast steel, ductile iron is cheaper, can be made in thinner, more intricate shapes, is easier to melt and handle, gives better surface finish, is partially "self-feeding" during solidification (if composition is controlled), has greater flexibility of heat treatment, and machines much better. Ductile

iron can be transformed from a soft, ferritic matrix to one of hard pearlite or very hard martensite (and vice versa at will by suitable heat treatment) because the carbon can be precipitated or dissolved, and when precipitated is in a spheroidal form.

Will ductile iron replace other metals? This question is one which interests the producer, consumer, and investor. Ductile iron should find its own level as a dependable engineering material; it will replace some metals, of course, where greater strengths and ductilities are required than can be obtained with gray or malleable irons, and where less ductility is needed than in cast steels. Currently, gray irons are somewhat cheaper, cast steels are somewhat tougher than ductile irons, and malleable iron reigns supreme for certain applications. It will probably still be some time before ductile iron earns its industrial spurs for, like good wine, it seems to be necessary that it age before being fully appreciated.



George W. Schmidt, Jr.

Shown above are six important properties of ductile iron, graphically portrayed in comparison to those of cast steel and gray iron.

Range of Microwaves Extended

DIRECT television and multi-channel telephone transmission through space for as much as 200 miles, without relay stations and at ultra-high frequencies, has been accomplished, Bell Telephone Laboratories and M.I.T. announced late in March. Television pictures, as well as radio and telephone conversations can be sent over the horizon on ultra-high frequencies, in an extension of a transmission technique applied to the continental defense system.

Principal virtue of over-the-horizon transmission is that longer communications bridges are possible over water and rugged terrain. In the present microwave radio relay network across the United States, relay stations are 30 miles apart.

Standard amplitude-modulated radio broadcasting employs waves that follow the earth's curvature. But waves used in television and telephone relays were presumed to travel in a straight line. For many years, "line-of-sight" transmission between antennas placed on towers on the horizon (about 30 miles apart) was

thought to be the only practical means of transmitting by radio the wide bands needed for television and multi-channel telephone service.

This was disproved after years of research at M.I.T. and the Bell Telephone Laboratories. The Bell Laboratories' research stemmed from Bell's success with transcontinental microwave systems for carrying telephone conversations, radio and television programs from coast to coast and their continued interest in radio propagation. The M.I.T. interest was stimulated by work for the government in radar and over-seas broadcasting.

Scientists knew that ultra-high frequencies traveled over the horizon under certain conditions, but believed them to be too weak and undependable for practical use. In the course of investigating occasional interference attributed to these waves, however, the scientists discovered that many actually overshoot the relay towers they were aimed at, and arrived at farther points with remarkable consistency.

The next step was to provide reliable long-distance transmission over the horizon. M.I.T. and Bell Lab-

oratories engineers did this by erecting larger antennas and using higher power than is employed in the conventional microwave system. Thus, they put to use the weaker signals that drop off a straight radio beam beyond the horizon and are reflected or scattered to distant points by the atmosphere.

The effect of the new system is very much like that of a powerful searchlight, which casts a beam in a straight line. A searchlight aimed at the sky can be seen from the ground miles away, even when the searchlight is behind a hill. This is possible because some of the light is reflected to the ground by the atmosphere.

Even after scientists learned that transmission was possible over the horizon, they were not certain that this medium would support the broad band of frequencies needed for multi-channel telephone or television transmission. In the fall of 1953, they found that they could transmit 12 voice channels over the horizon.

Television was first successfully transmitted over the horizon in 1954 between the Holmdel, N.J., laboratory of the Bell Telephone Laboratories and the M.I.T. Round Hill Research Station near New Bedford, Mass., a distance of 188 miles. Bell and M.I.T. scientists emphasize that this success with over-the-horizon transmission will probably result in a supplement to, rather than a replacement of, line-of-sight radio relay systems.

Over-the-horizon signals are not to be confused with a similar type of transmission known as "ionospheric scatter," which is useful in long-distance transmission of telegraph signals at relatively low frequencies. Unlike ionospheric signals, the over-the-horizon technique provides signals that are useful for the wide band widths required for a television picture or by many telephone channels.

Disposal Proposal

A MAJOR problem created by the concentration of vast numbers of people in urban residential areas is the disposal of wastes — sewage, trash, and garbage. Sewage disposal as a rule can be accomplished satisfactorily, by means of modern sewerage systems and sewage treatment methods. Nondecomposable trash, if collected separately from garbage, may be burned when combustible, otherwise used as land fill. Getting rid of garbage — putrescible organic household refuse — is the biggest difficulty. Garbage can be burned; but incinerators and their operation are costly, and apt to pollute the air.

For a while the "sanitary land fill" was thought to hold great promise for municipal garbage disposal. This procedure involves using garbage to fill in swamps, or other low-level land, for reclamation purposes, and keeping the top surface of the refuse covered with clean earth. But a serious weakness has developed at the "working surface," the exposed strip of recently dumped garbage. The inevitable occurrence of fires, stench, and insect and rodent nuisances at the working surface have militated against wide adoption of the sanitary land fill.

A procedure long used abroad, but only recently tried in the United States, is the composting of

garbage. Composting in its basic sense is familiar to farmers, and even to suburban gardeners. Suburbanites, for example, often accumulate grass cuttings and fallen leaves in a compost heap and then, after decomposition is complete, use the resultant material for fertilizer.

Experience in Europe, Asia, and South Africa has demonstrated that domestic garbage can be successfully composted by itself on a large scale. It is necessary first to grind coarsely or shred the garbage, employing a hammer mill or any other machine that will break up the refuse without pulping it. The ground garbage is stacked in windrows, on the ground out of doors; then is periodically aerated by turning about twice a week with spades or forks.

Garbage composting is reported to be quite free of unpleasant odors, provided the heaps are well aerated. The characteristic sour odor of the garbage disappears as soon as it is ground. During the first three or four days of composting there is a faint "cooking" odor, followed by a slight musty or earthy odor, followed finally by complete disappearance of odor when composting is complete. The color of the refuse at first is the grayish-green of freshly ground garbage; this gradually turns to the dark brownish-gray typical of compost made from whatever material.

The progress of composting may thus be followed by gross observations of color changes. Internal temperatures of the heaps are also a clue; these temperatures first rise to about 75 degrees C. within a few days, then gradually fall to about 55 degrees C. at the end of two or three weeks. Then decomposition is complete and no further rotting can ensue. The end point of composting may be verified by chemical analysis for carbon and nitrogen. When a carbon to nitrogen ratio of 20 to one has been reached, composting is complete and the compost may be used on agricultural soils without "robbing" nitrogen.

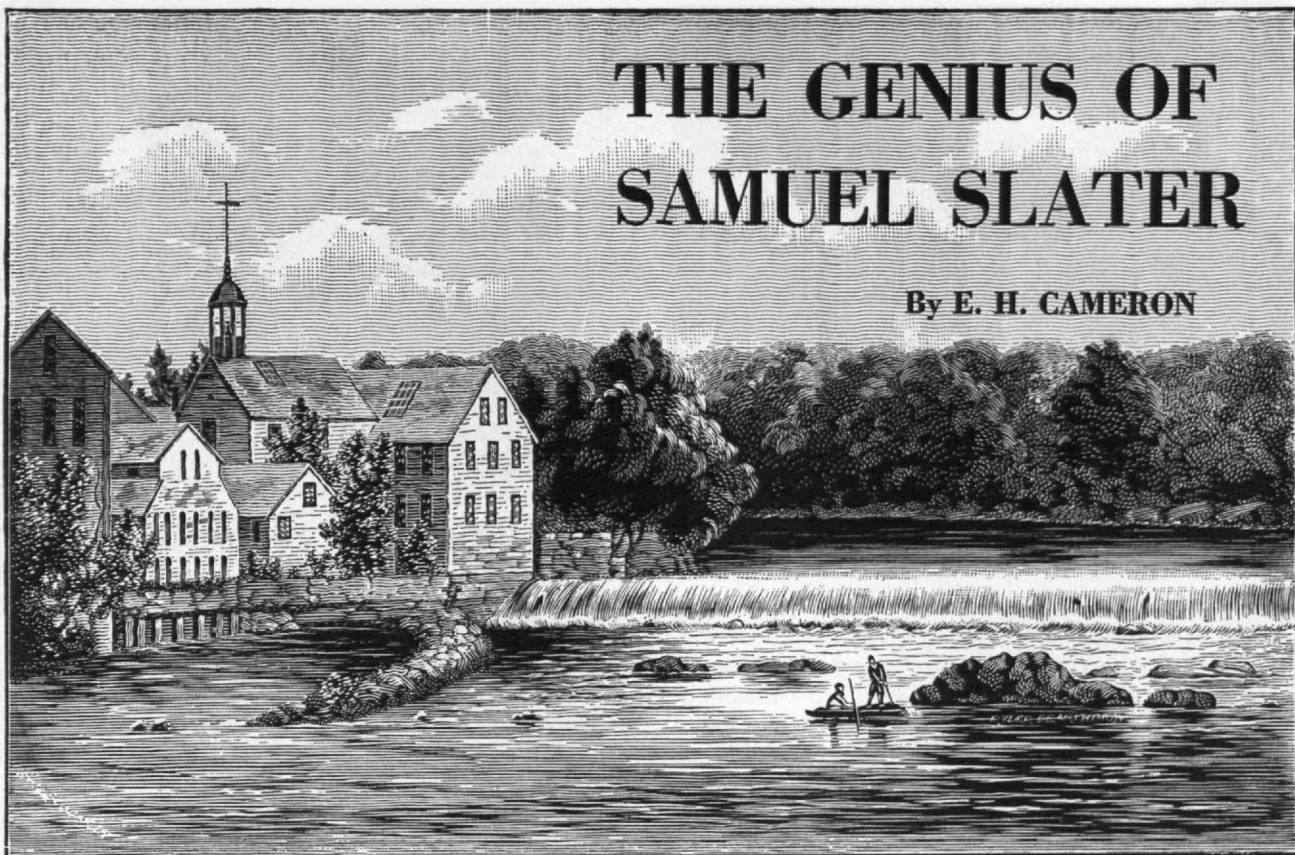
As a fertilizer, compost made from domestic garbage provides nitrogen, phosphorus, potassium, and trace elements to promote plant growth. Aside from its chemical values, such compost is beneficial to agricultural soils by improving their physical texture, increasing water retention, and fostering development of extensive root systems.

Proposed use of compost from domestic garbage, as a fertilizer in the growing of foods, brings to mind the serious disease transmission caused by use of human excreta for fertilizer in the Orient. Therefore, it is reassuring to learn that the sustained high temperatures spontaneously generated by composting reliably kill all common disease germs and parasites.

Thus the composting of domestic garbage converts a foul offensive waste into a stable valuable fertilizer. The process does not cause odor, insect, or rodent nuisances. It is safe from the public health standpoint. But whether garbage composting will ever find wide adoption by United States cities depends upon local climates, and also upon financial considerations such as costs of segregating decomposable organic garbage from nonputrescible trash, expense of the composting process, and economics of the storage, distribution, and use as fertilizer of the resulting compost.

THE GENIUS OF SAMUEL SLATER

By E. H. CAMERON



View of the Old Slater Mill in 1840

From an old print

When the Old Slater Mill, in Pawtucket, R.I., opens its doors to the public as a museum of the early textile industry, many people will be attracted to view its exhibits. These will include not only textile men, but also the general public, with its appetite for history, Americana, and the moving wheels of machines. Those engaged in textile manufacturing will not have to be told that the Old Slater Mill, built in 1793, is the shrine of the American cotton textile industry. Displayed before all visitors will be authentic evidence of the genius of Samuel Slater, who introduced to America the equipment and factory processes that started our textile industry on its way to success.

DURING the period of the American Revolution, whereby the 13 Colonies became independent of England, another revolution was under way within the confines of England itself. This was the industrial revolution; which has been called "probably the greatest evolution in human history."* The factory methods that it developed were made to order for the industrially impoverished, young United States of America. In the United States, as in England, the textile industry led the way in the application of these factory methods.†

The story of the introduction of these novel methods in America by Samuel Slater has become

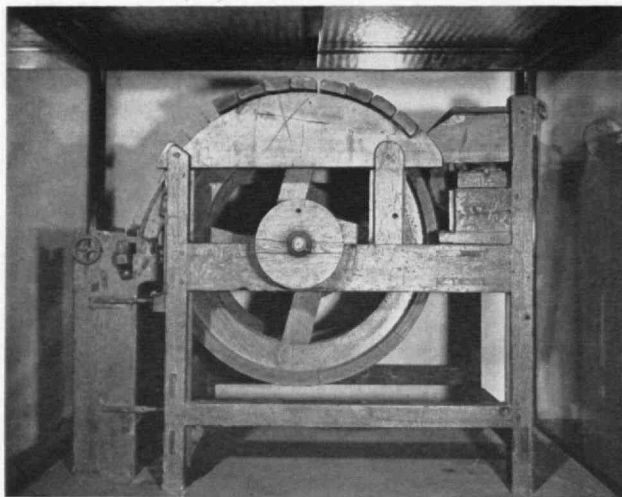
*Roger Burlingame, *March of the Iron Men*, page 91 (New York: Charles Scribner's Sons, 1949).

†*Historians' History of the World*, XXI: 484 (New York: The Outlook Company. London: The History Association, 1904).

an inspiring saga among textile men, for it was the genesis of the great industrial system that now leads the world in its production processes. The Slater story is in three parts. The first part reviews the events of the industrial revolution in its early English phases, and tells of the apprenticeship of Slater, whereby he learned to build, install, and operate the newly invented equipment for the preparation of cotton and the spinning of cotton yarn by machines. The second part describes his remarkable duplication of the English machines in Rhode Island, which he installed and operated in the first successful cotton mill in America. The third part is the account of his creation of the widespread Slater establishment that became such an important factor in early American textile development during the first third of the Nineteenth Century.

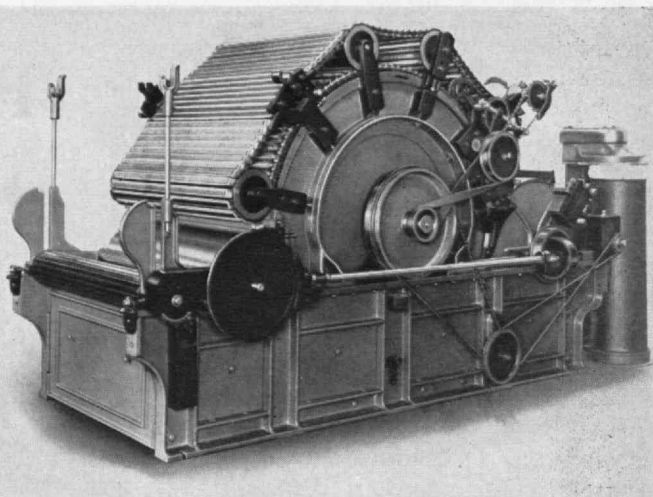
Industrial Revolution

At the time of the birth of Samuel Slater (June 9, 1768) the early stages of the invention of machine methods for the carding and spinning of yarn were under way. The crude models were made with timber frames, wooden cogwheels, and had very few parts of metal. Yet they gave promise of success in simulating the deft touch of human fingers and the precise timing of muscular effort that our ancestors had performed since prehistoric time, as they spun yarn for their clothing. The clever English mechanics who made these crude models did not realize that they had started the industrial revolution, with its factory system upon which our modern industrial economy is based. The period of



Courtesy of U.S. National Museum (Smithsonian)

Contrasting the old and the new, at left may be viewed the Samuel Slater Carding Machine of 1790, and, at right, one of the modern cotton cards.



Courtesy of Whitin Machine Works

inventive activity continued, and as more successful machines were developed, a novel establishment was created—the factory. Factories were huge places for the quantity production of goods by machine. These were soon to replace the numerous home shops where goods in small, individual quantities, but of immense aggregate volume, had been made by hand for generations—in the villages and on the farms of the thriving handicraft textile centers of England.

Historians define the three major factors that caused the industrial revolution as: the invention of textile machinery; the invention of the Watt steam engine; and the discovery that iron ore could be smelted by the use of coke.

The machines of the early factories were driven by water wheels. Thus, the factories were located in the rural areas, along streams where good water-power sites were to be found. When it became increasingly difficult to recruit a sufficient supply of mill operatives to work in the rural areas, steam gave the answer, for it could supply power, miles from any water-power site. Huge, steam-driven factories therefore rose in Manchester and other English cities, where labor was plentiful. With the discovery that they could substitute coke for the charcoal derived from the sadly depleted forests, the foundries and forges of England became able to increase their production of iron. The textile industry was a ready market, for better machines could be made from cast iron or wrought iron; wooden members could be largely dispensed with. There was the corollary stimulus toward greater accuracy in machine tool methods, which was of immense advantage to all industry: textile, iron, and the rest.

The Apprentice

Samuel Slater grew up with the industrial revolution in England. He was born a few months before Watt secured his patent for his steam engine, and one year before a patent (later annulled) was granted to Richard Arkwright for his famous spinning machine, which was called the water frame, because it was driven by water power. Distinguished names in the archives of textile history are those of the

ingenious men who contributed to the ultimate success of the machine methods—Kay (flying shuttle), Wyatt, Paul, High (early spinning models), Hargreaves (spinning jenny), Crompton (mule spinner), Cartwright (power loom, years later), and Arkwright, whose unified system of carding, roving, drawing, and spinning was to achieve the greatest success. He became the great Sir Richard Arkwright, major prophet of the industrial revolution. In the place of his birth, Belper Township, Derbyshire County, Samuel Slater was to be introduced at the age of 14 to the Arkwright system of spinning yarn, which he was in turn to introduce to the struggling American cotton industry a few years later.

In 1769, Arkwright had built the world's first spinning mill at Hockley, near Nottingham Market. Here he strove to perfect his water frame that was coupled temporarily to horses as prime movers. As he needed money, he entered partnership with Jedediah Strutt, a prosperous manufacturer of ribbed stockings in Derby. The partnership was a success. In 1771 it built the world's first water-powered spinning mill at Cromford on the River Derwent, and also another mill a few miles south in Belper in 1776, which Strutt took over when the partnership was dissolved. As Strutt's activities expanded, he needed more factory help, and asked his neighbor, William Slater, a prosperous farmer and timber merchant, to apprentice his eldest son to him. The father recommended a younger son, Samuel, however. "He writes well and is good at figures," Slater explained.

Shortly thereafter, as William Slater was binding a load of hay, the rope broke and he fell backward off the wagon. He was badly hurt. When Samuel asked him to arrange for a formal indenture, he replied: "You must do that business yourself, Samuel, I have so much to do and so little time to do it." And the sturdy English yeoman, William Slater, passed away a few hours later.†

So the boy of 14 went to the mature businessman, Strutt, and discussed the future prospects of this new industry of the machine spinning of yarn. When he received a reasonably optimistic estimate of the

† *Derby Mercury*, August 8 to 15, 1782.

future from Strutt, who was later to become very wealthy, Samuel Slater made his first important decision.

It was in the year of the ending of the American Revolution (1783) that Samuel Slater signed his indenture as an apprentice to Jedediah Strutt for six and one-half years. He was under a good master, who had been a close friend of his deceased father, William Slater. Faithfully young Slater kept to the terms of his indenture to the end. Under Strutt his mechanical genius was developed, and his ability to manage others was recognized by his employer when Strutt finally put him in charge of still further new factory activities.

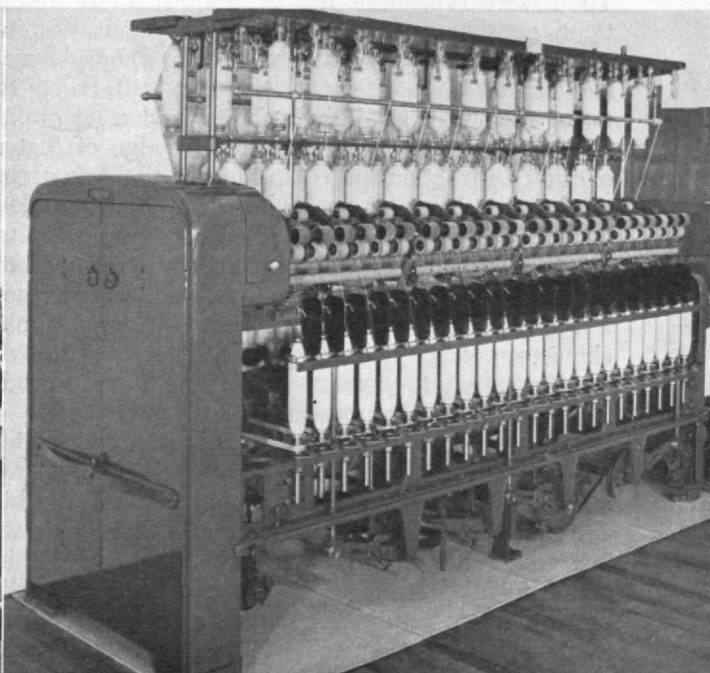
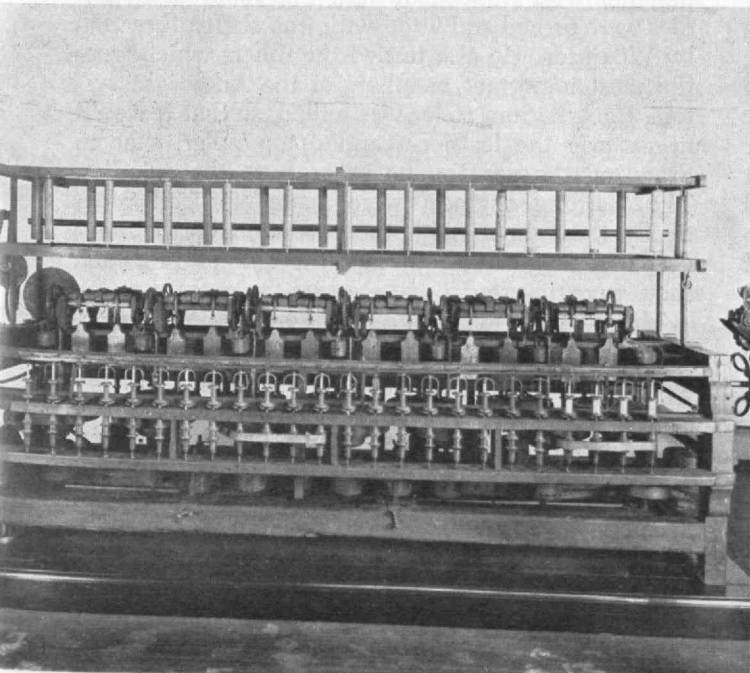
As the termination of his indenture approached, young Slater faced another and still more important decision — what to do next. In the making of this decision he asked no advice. Even in that day of limited communications, the news reached Derbyshire that certain American organizations had advertised for men who could build the Arkwright spinning equipment. Slater also knew of the rigid English restrictions on the emigration of trained mechanics or of those who would carry models or drawings of these precious machines that were making many Englishmen prosperous. The emigration of farm laborers was not forbidden. What tall, young man of an engaging presence knew more about the Arkwright system than Samuel Slater? What man could better keep his plans to himself, even to the extent of not informing his own mother that he was planning to go to America? English records indicate that Slater was a typical emigrant of his day. The ill-conceived English laws did not stop any resolute mechanic from going to America, despite them. Reputedly in the guise of a farm laborer, Slater embarked from London, and after a 66-day voyage arrived in New York in November, 1789, at the age of 21. This was the year when the American colo-

nies became the United States of America, with the adoption of its constitution.

The First Mill

The American need for men like Slater, who knew the manufacturing processes, was acute. America was an agricultural country; 95 per cent of its population resided in rural regions. Although it also had a flourishing commerce and a valuable fishery trade, it was pitifully poor as regards manufacturing industry. With few exceptions, its manufacture was limited to handmade goods, produced for use by those who resided in the homes in which they were made. Farseeing statesmen and men of business realized the industrial needs of the young American republic, and took steps to promote industry here. Their efforts concentrated on the securing of information on the new and highly successful English textile machines for the spinning of yarn. (A quarter of a century was to elapse before a practical power loom was perfected.) As regards clothing, every New England home was a textile factory that spun its home-grown flax and reared its own sheep for wool, which was woven with the flax into the rough, yet warm linsey-woolsey for family raiment. The great natural resources of America lay fallow, because of the lack of manufacturing methods to develop them.

Samuel Slater was to begin to realize this condition when he went to the New York Manufacturing Company upon his arrival in America to ask for a job. He was disappointed to find that their antiquated machines were not "worth using." Captain Curry, a newly made friend of Slater's in New York, advised him to see next a wealthy Providence Quaker named Moses Brown, whose firm, Almy and Brown, was concerned in a textile venture and needed help. His businesslike letter to Brown re-



Courtesy of U.S. National Museum (Smithsonian)

(Right) Modern cotton spinning frame, used for experimental work, selected for comparison with Slater frame (left). Modern spinning frames, used in production, are about five times as long as that shown at the right.



White's Memoir of Samuel Slater

Pawtucket in the 1830's. The belfry of the Old Slater Mill appears just above the bridge on the left bank of the Blackstone River.

sulted in an invitation for Slater to visit him and the promise of a generous share of the profits if Slater could succeed in making the heterogeneous collection of spinning machines, that Brown had assembled, produce yarn of a satisfactory quality.

Arriving in Providence, Slater was sent to Pawtucket, where the Brown machines had been set up. He examined them and pronounced them worthless. They were typical of the several American imitations of the Arkwright machines, which despite state aid in Massachusetts, bonuses in Pennsylvania, and similar inducements elsewhere, still failed to make good yarn at all, or at best, yielded no profit.

Impressed with the evident knowledge of Slater of the construction and operation of the Arkwright machines in England, shrewd Moses Brown gambled on the ability of the young English immigrant to reproduce them. In the partnership agreement of a new firm, Almy, Brown & Slater, the new partner was to construct and operate the Arkwright machines at a wage of \$1.00 per day. Almy and Brown were to supply the money, market the finished product, and give Slater one-half the net profits.

An inspiring story in the annals of American industry is the account of Slater's success. By a remarkable feat of memory, supplemented by his unusual mechanical ability, with no models or drawings to guide him, this youth of 21 produced, within a few months, equipment that performed the delicate processes required to transform raw cotton into finished yarn of superior quality. His master, Strutt, could attest to this fact when he examined sample yarn that his former apprentice had proudly sent him. In this accomplishment, he was assisted by

Sylvanus Brown, a noted worker in wood, and David Wilkinson, who was skilled in the shaping of iron.

It was wholly a handmade job, made mostly of wooden members, like the original English models. On the floor of the little woodworking shop of Sylvanus Brown in Pawtucket, Slater sketched the frameworks in chalk, according to one account. Brown cut them out of good oak and fastened them together with wooden dowels. The many oak spindles were turned and fitted with iron shafts, threaded by Wilkinson. He also turned the rollers which were the most important members of the Arkwright system. Each bottom roller was milled, so that it would firmly grip the leather-wrapped top roller, thus to draw out the yarn on its progress to the spindles. The "carding engines" were made of wood practically throughout, with the exception of the hundreds of tiny iron teeth and the leather in which they were inserted.

The mature mechanics, Brown and Wilkinson, accepted the opinions of young Slater, as he recalled each detail of the Arkwright machines and told them how to reproduce them. He had to keep ahead of these mechanics. He made sketches, devised special tools to build the unusual members, and inspected the finished ones. We may believe the old account that said that he worked day and night. Their accomplishment may be studied today, for one of their "carding engines" and a water frame are now on exhibit in the National Museum (Smithsonian) in Washington.

To those who know its story, the Slater-built Arkwright machines are among the most inspiring exhibits at Smithsonian. Like the early textile equip-

ment in English museums, they are crude, and their working elements are far short of the smoothly efficient functional arrangements by which modern equipment spins cotton into yarn to today's high standards. Yet it was the best American spinning gear of the time, and it made good yarn.

The carding engines, water-frame spinners, and auxiliary equipment were set up in Carpenter's Clothier's Shop in Pawtucket, which was driven by a water wheel fed by the Blackstone River. The machines were soon producing so much yarn that its marketers, Almy and Brown, were swamping the market. This is easy to understand, for Slater's first two water frames had 24 and 48 spindles. They were in continuous operation, as compared with the single-spindle, hand-spinning wheels that were operated in the local farmhouses, and that had supplied the demand for yarn up to that date.

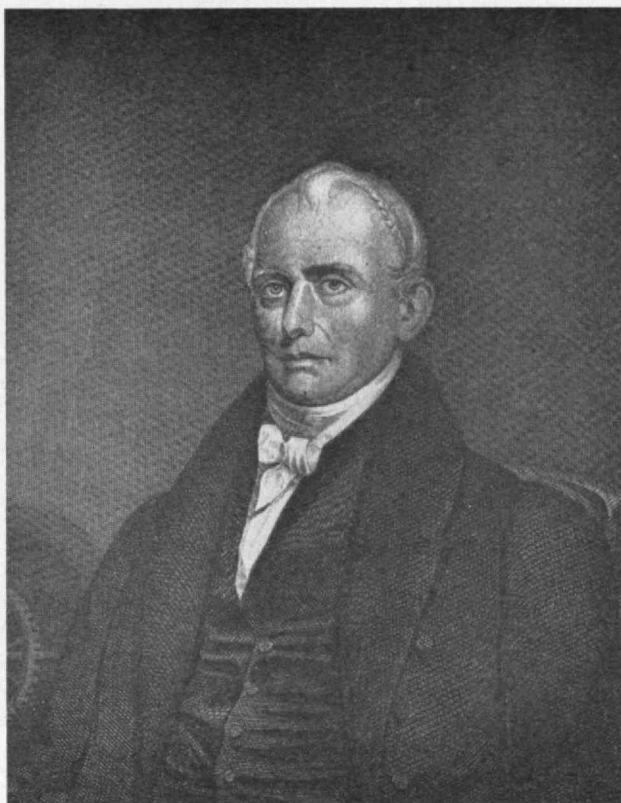
This first cotton mill in America successfully to use the Arkwright machines started operations on December 20, 1790. It was the year of our first census, which reported the American cotton crop as 3,000 bales, as compared with 1,062,000 bales in the year of the death of Samuel Slater (1835). When the accounts of Almy, Brown & Slater were squared two years later, Slater's share of the profits was computed to be more than £400. Added to his wages, this represented a handsome income for a man of 24, in this year of 1792.

Except for the supervisor, Samuel Slater, only children worked in Slater's first American mill, at the start. At the end of three weeks, it had seven boys and two girls, whose ages ranged from seven to 12 years. They operated the new machines, under the strict supervision of young Slater, who had the reputation of being a strict disciplinarian, although scrupulously fair. In America and England it was decidedly the day of child labor. The children were used to this. In this period of scant power equipment the efforts of many hands were required, and many tasks could be performed by children's tiny hands.

Gradually a market for so much machine-spun yarn was developed; first, by "putting it out" to the local homes for hand weaving, or by selling the yarn outright. Ultimately, Almy, Brown & Slater yarn could be purchased from agents located from Portland, Maine, to Charleston, S. C. Long before this wider market was established, the demand had outgrown the capacity of the equipment of small Carpenter's Clothier's Shop. Like the proprietors of all small, successful ventures, the firm decided to expand. They built what is now the Old Slater Mill, and started operation there in 1793.

The Old Slater Mill

A timber dam was built about 20 rods upstream of the 60-year-old dam at Carpenter's Clothier's Shop; an intake above the new dam led the water to a narrow millpond, from which a flume led to the single water wheel at the mill. The mill was 44 feet long, 30 feet wide, and had 2½ stories. It was built much like a New England barn, with vertical sideboards, nailed to horizontal, hewn timber members at top and bottom. Unlike a barn, the mill had



White's Memoir of Samuel Slater

Samuel Slater

clapboards and was plastered and whitewashed inside. It was heated by stoves, and before sunrise and after twilight was lighted by candles. (It is possible that some oil lamps were also used.) The mill had a bell tower and a bell that weighed 60 pounds. Whether they slept in feather beds or on cornhusk mattresses, the bell warned the juvenile and adult operatives when to arise and go to work.

As the bales of raw cotton, then averaging 225 pounds in weight, were received at the mill, portions of the cotton were sent out to the various homes in the vicinity where it was cleaned on flakes. These consisted of cord screens that would let through the motes, hulls, or other trash, when beaten with willow switches by the women. The cleaned bunting was returned to the mills to be spun into yarn. On the grassy area about the mill, women and children then spread the yarn, praying for days of long continued sunshine. Kept wet by frequent sprinkling by watering pots, the yarn would bleach under the action of the sun and air in a period of about four weeks. The yarn would then be sent back to the local homes to be handwoven into cloth and returned to the mill for dyeing and finishing. Several years would elapse before all these processings of the raw cotton into fabric were to be carried on under the one roof of a cotton mill.

This pioneer cotton mill development was typical of the many textile mills that were to appear along the New England rivers within a few decades, on sites where a good flow of water could be expected for most of the year, and where a dam of suitable height could be constructed. Several such mills were

built by Slater, many by competitors who were inspired by his success. More than one was built by those who had learned the methods of spinning in a Slater mill. Historians of the American textile industry emphasize the part played by Slater as a teacher of the Arkwright processes. In particular, the Blackstone River became known as the hardest working little river in the world. An ample supply of American cotton was soon to be assured by the invention of the cotton gin, which was invented by Eli Whitney in the year of the building of the Old Slater Mill (1793), and patented a year later.§

More Mills

The success of the Old Slater Mill led to his next American venture, as equipment was improved and the market for cotton yarn was developed. In his early thirties, Slater had so impressed others with his mechanical genius, operating ability, and sound financial judgment that he was able to promote the building of the "White Mill," at the easterly end of the upper dam. It was operated by a new firm: Samuel Slater & Company. As his activities continued to expand, Slater called upon a younger brother, John Slater, to come to his assistance. John was a millwright in England, who was experienced in the operation of the Crompton mule spinner, then recently invented. A pack-horse trail exploration of the northerly wilderness along the Blackstone River by John Slater led to the selection of the site of the next Samuel Slater cotton mill development. It was on the Branch River, a tributary of the Blackstone, in Smithfield. Here, dam, mill, and cottages for the operatives were built and the village was named Slatersville, in 1806.

Learning of the water-power advantages of mill-sites in Oxford, Mass., shortly before the War of 1812, Samuel Slater started and developed an extensive textile establishment there, which continued to be one of his major activities until his death. This became the town of Webster in the year 1832. He also promoted the Providence Steam Cotton Company—one of the first cotton mills to be powered by steam in America.

When they ran into financial difficulties, the proprietors of a tiny mill, located at a point on the Merrimack River in New Hampshire, asked Samuel Slater for a loan, about 1816. Slater drove to the site in his chaise, and was greatly impressed with its superb water-power possibilities. He was active in the development of this enterprise.|| The mill was enlarged, new equipment added, and the growing enterprise became prosperous. It was under his management that it became the Amoskeag Manufacturing Company, in Manchester, which in its heyday, years after his death, had 728,000 spindles and 24,000 looms, which turned out cloth at the rate of more than a mile a minute. Up to his death, Slater continued as a stockholder in Amoskeag.

§Jeannette Mirsky and Allan Nevins, *The World of Eli Whitney*, page 68 (New York: The Macmillan Company, 1952).

||William P. Straw, *Amoskeag in New Hampshire*, page 10 (New York: The Newcomen Society of England, American Branch, 1948).

Samuel Slater & Sons

There were other Slater ventures, located in Massachusetts, Rhode Island, and Connecticut, nearly all of which were promoted and organized under partnership arrangements by Slater himself. His major partners were relatives of the talented family of his first wife, Hannah Wilkinson; his brother John; and his sons, whom he had trained to the methods of mill operation that he had found successful. Toward the end of his life, he established the partnership of Samuel Slater & Sons. While he had provided for the proper education of his sons, he put them to work in his mills in their very early teens; business and education went on simultaneously for one or another of them. He assigned heavy responsibilities to his sons, and while still young men, they carried on and expanded the Slater textile estate successfully after his death.

The file of letters between father and sons and from son to son, provides a heartening revelation of an admirable family relationship. Business problems and the care of their own health were discussed in his letters to them, spiced with a dry humor often expressed in Biblical terms.

Space does not permit a detailed description of the Slater ventures following his construction of the Old Slater Mill. They were promoted, built, and operated by the exercise of the same traits of business acumen and personal characteristics by which he had made his early ventures successful. The promotional, mechanical, and operating talents of Samuel Slater have been described. His possession of these qualities does not wholly explain his remarkable success, however; they were supplemented by personal characteristics that were of equal importance. Matching his tremendous confidence in his own ability to accomplish his ends, was an innate quality whereby he inspired the necessary confidence in others that he could come through. The most cogent example of this Slater trait was his quick convincing of the shrewd Yankee-Quaker, Moses Brown, that he should finance Slater. At the time after the Revolution, when all Englishmen were under suspicion, the young English immigrant, Slater, so impressed Brown that he backed him with Brown dollars, that were always closely counted. A common trait of the two men was their integrity.

In later life, Slater once told a friend that he had averaged 16 hours of work a day during his first 20 years in America. We can easily believe this statement. He had to travel from one mill to another by chaise, or an occasional stagecoach. He had to write all his correspondence by hand with a goose quill pen; he had to demonstrate personally many of the processes of his mills, they were so new.

Withal, he found time for the other things of life: was a distinguished lay member of his Episcopal church; a noted philanthropist; a bank president; the man whom some accredited with the starting of the first Sunday School in America; he got pleasure from his farm.

Samuel Slater died on April 20, 1835. Two years before his death he received a tribute from a high

(Continued on page 368)



Aerial view of Cerro Bolivar, prior to construction and mining operations

Iron Ore from Cerro Bolivar

*When a Mountain of Iron Is Located Deep in a Country
Devoid of Modern Transportation Facilities,
Great Engineering Talent Is Called for*

By RICHARD FINNIE

IN southeasterly Venezuela, one of the largest of the tributaries of the Orinoco is the Caroni, which flows northward from the interior. About 50 miles due south of the Orinoco and somewhat west of the Caroni stands a certain hill — 1 mile wide, $4\frac{1}{2}$ miles long, and 1,800 feet high. In 1947, after two years of intensive investigation in Venezuela, geologists of United States Steel Corporation determined that this hill, whose name was changed from La Parida to Cerro Bolivar, was encrusted in iron ore.

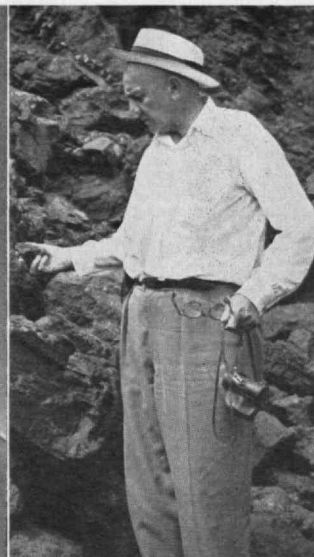
The exploration survey which resulted in the discovery of Cerro Bolivar and adjacent iron-ore deposits was conducted under the direction of Mack C. Lake, consulting geologist and mining engineer, while F. H. Kihlstedt was the engineer who personally led the discovery group. Mack Lake was destined in January, 1950, to be the first president of Orinoco Mining Company, a U. S. Steel subsidiary formed to develop the deposits.

Supplies were brought up the hill by every available means, including tractors and burros. A churn drill was set up to plumb the ore body. Wagon drills pressed against a sheer surface to begin an explora-

tory tunnel. A pilot screening plant was assembled. The tunnel went deeper and deeper. The broken ore was trundled out, carload after carload.

By now the facts were known: Cerro Bolivar was capped with a thick deposit of high-grade iron ore. It contained more than 400,000,000 tons averaging about 58 per cent iron. Plans were made for production and shipment — once full production was achieved — at an initial annual rate of 5,000,000 gross tons, with provision for expansion to 10 or more million tons.

It was one thing to locate this ore body; it was quite another thing to develop it. Orinoco Mining Company proceeded to solve a major problem of logistics: first, to bring in supplies and equipment; and then to get out the ore and carry it to market. Camps had to be set up, a road and trackage had to be pushed across grassland and jungle between the hill and the Orinoco, where crushing and handling equipment — an integrated part of the mining operation — and port facilities would be needed, while a channel would have to be dredged for ore-carrying vessels.



Simplified map of Venezuela showing locations of Caracas, Ciudad Bolívar, Cerro Bolívar, Puerto Ordaz, and the Orinoco and Caroni Rivers. Navigation route to and from Puerto Ordaz and the Atlantic is through the Caño Macareo. Right: The late Mack C. Lake, consulting geologist and engineer, in charge of exploration survey that resulted in the discovery of Cerro Bolívar.

Early in 1952 a bulldozer crashed through the thick growth at the confluence of the Caroni and Orinoco, clearing a site for a construction camp at the future port. Thus started a long-range construction program—one of the most ambitious ever undertaken by private capital in a far country. Construction crews lived in houseboats tied up to the shore, supplemented by tents on high ground nearby. A new community was in the making—Puerto Ordaz it was named, after the first Spanish explorer who sailed up the Orinoco in 1531.

To the Puerto Ordaz waterfront early every morning came a variety of craft bringing Venezuelan workers from the town of San Felix several miles downstream. A converted L.C.T. carried about 500 of the men who were employed on the construction of the main base camp and harbor. All told, the Orinoco Project would absorb a peak force of 7,000 people, over 75 per cent of whom would be Venezuelans—on the river and overland to Cerro Bolívar, as well as at Puerto Ordaz itself.

The constructors proceeded to erect dwellings, office buildings, shops, and warehouses for the base camp. There were temporary tanks for the storage of fuel oil and gasoline, and Diesel engines and generators for a temporary power supply. Machine shops and repair shops maintained a growing list of equipment. There was two-way radio-telephone connection with Caracas as well as nearby outposts and river traffic. A landing strip was laid out for daily passenger airplane service to and from Caracas and elsewhere.

Of prime consideration was the health of all the employees, so a fully equipped and well-staffed clinic was set up to carry on until a permanent hospital was built. Water piped from the Caroni was filtered, chlorinated, and distributed for use during the construction period.

Only a few months after the beachhead had been established, Puerto Ordaz was taking on the appearance of a thriving community. Not all of the work was going on out-of-doors. Administrative people, engi-

neers, and warehousemen spent long hours keeping abreast of their varied duties. Both men and women were employed in the offices, where reports, plans, and specifications were made out in Spanish and English, and where business was regularly conducted in the two languages.

Management meetings were held daily to insure a smooth-running organization. Officials of Orinoco Mining Company met with those of Constructora Bechtel, who were the managers of construction. The physical work on the project was being done by 30 Venezuelan contractors and several North American firms. The management group was backed by supervisors and office people, both North Americans and Venezuelans.

Every North American here was expected to act as an unofficial ambassador of good will, as well as a technician and teacher. There were only a few in relation to the total force, and each was a key man, helping new Venezuelan employees to learn new skills and improve their earning power.

In May, 1952, a strange craft appeared on the Orinoco, being towed upstream. It was the largest steel structure ever built in the form of a barge, and it came from U. S. Steel's Consolidated Western Steel Division yard at Orange, Texas, 2,500 miles away. It was 82 feet wide, 376 feet long, 15 feet deep, and weighed 2,250 tons. It was the first of three identical barges that were to be fixed end to end to form a revolutionary type of dock for the handling of cargo and the loading of ore at Puerto Ordaz.

Bulldozers and scrapers pushed and carried great quantities of fill for a shore approach. When the barge was maneuvered into its final position, a remarkable operation ensued. On the deck were carried twenty-six 100-foot lengths of steel pipe, six feet in diameter. These were to serve as caissons or piles on which the barge would eventually stand. One at a time the caissons were hoisted to a vertical position by a 100-ton-capacity crawler crane. Then they were dropped through wells on each side of the barge, in two rows of 13, until all stood on the river bottom.

The next step was to raise the barge to pier height, which had to be above flood stage—an elevation here of about 40 feet above low water. The hoisting was done by a combination of ingenious air jacks. Fitting over the circumference of each caisson and attached to the deck, the air jacks climbed the caissons much as a boy might shinny up a tree. With all the jacks operating in unison, every time their upper halves were raised six inches, the whole structure went along with them. When the barge reached its ultimate height, the big crane swung into action with a steam hammer weighing 40 tons. One at a time the jacks were released while the caissons were driven home to bedrock. After that, the projecting tops of the caissons were trimmed to deck level.

As the season advanced, the two remaining barges in succession were brought from the Gulf Coast to Puerto Ordaz. They carried on deck not only their 26 caissons apiece but also a great deal of heavy freight. When all three barges were fitted into position they became a permanent heavy-duty, all-purpose dock, 1,128 feet in length. This unique dock saved months that would have been expended for a conventional one of comparable size and strength.

The initial freight for pioneer construction had been lightered ashore; but only 11 days after the arrival of the first of the caisson barges that formed a dock, a supply ship was able to come alongside to unload. From that time on, all manner of freight, no matter how heavy or bulky, could be unloaded promptly. Before the end of the project, about 300,000 tons of material and equipment would have crossed this dock. Not only were pieces of heavy construction equipment coming ashore, along with thousands of other items immediately needed, but also rolling stock for the mine transportation system.

Southward along the route to the Cerro Bolivar area, roadbed was rapidly prepared. The highway, which would generally parallel the rail line, had first priority for the moving of construction supplies. Truck convoys carried cargoes of all shapes and sizes. As part of the program for the ore-gathering system, the contractors had to erect 13 major bridges across tributaries of the Caroni. They also had a couple of underpasses to put in, and several thousand drainage structures.

As operations extended ever farther along the route, outposts called fly camps were set up at intervals for the accommodation of equipment operators, surveyors, and their helpers. House trailers were favored for their versatility as well as mobility. They were adapted as mess halls as well as sleeping quarters and, thanks to modern refrigeration and kitchen facilities, the food served was always varied and wholesome. As for sleeping quarters, while the North Americans stuck to their familiar beds, Venezuelan workmen preferred the *chinchorros*, or hammocks.

Parties of surveyors pressed on through savanna and jungle, with a special group wielding machetes to clear away undergrowth for a view of the line ahead. They toiled up the slopes of Cerro Bolivar, surveying right of way for the tracks that would be winding to the crest. Construction crews gained a foothold around the top of the hill. Day after day, fresh sets of holes were drilled. Day after day, the



Palm-thatched huts on stilts at Indian village in the Orinoco delta. This type of construction in another area of the country inspired early explorers to use the name Venezuela, meaning Little Venice.

powder men placed their charges of dynamite. Bulldozers swept the loosened material down the slopes, and the track grade took shape. Before the end of 1952 all remaining gaps in the supply line were filled in. The ribbon of right of way winding around the hill was now connected with the new highway which ran northeastward 90 miles to the Orinoco.

In February, 1953, Benjamin F. Fairless, chairman of the Board of U. S. Steel, paying his first visit to Venezuela, keynoted the spirit in which the Orinoco Project was being conducted when he spoke at a luncheon given in his honor by Caracas businessmen.

"Our respective interests," he said, "are mutual. We are partners in this venture. The purpose of our partnership is to transform iron into gold—not through the mysterious black magic of the ancient alchemists, but through the modern miracle of mutual incentive under a system of free enterprise."

Several days later he inspected Cerro Bolivar. He was accompanied by a group that included M. W. Reed, Executive Vice-president of U. S. Steel, and E. M. Voorhees, chairman of the Finance Committee. It was a happy occasion for Mack Lake when he led these men into an exploratory tunnel to see for themselves what lay beneath the surface of the hill.*

Through the months that followed, drillers patterned the hillside with holes into which charges of dynamite were loaded. Power shovels with six-yard buckets cleaned out the blasted ore to make new access benches.

Current would be needed for a new electric shovel, for maintenance shops and other installations on the hill. And to carry that current, poles were marching up the slopes. In the valley, near the base of the hill, a large new building contained two Diesel generators which would supply power to Cerro Bolivar and also to the nearby townsite of Ciudad Piar. Here was a miniature modern city whose creation was part of the Orinoco Project, with row after row of houses.

The Orinoco River—one of the world's great waterways—was to be conditioned for direct north-

* This was Mack Lake's last inspection of Cerro Bolivar. He died in San Francisco less than two years later.

ward shipment of iron ore. This necessitated the dredging of a total of 32 miles of the 172-mile course from Puerto Ordaz to the Serpent's Mouth at the Gulf of Paria. While shorter than the Mississippi, the Orinoco brings down about the same volume of water, reaching flood peak in August, heavily charged with sediment. A long-range program of channel improvement was started in March, 1952.

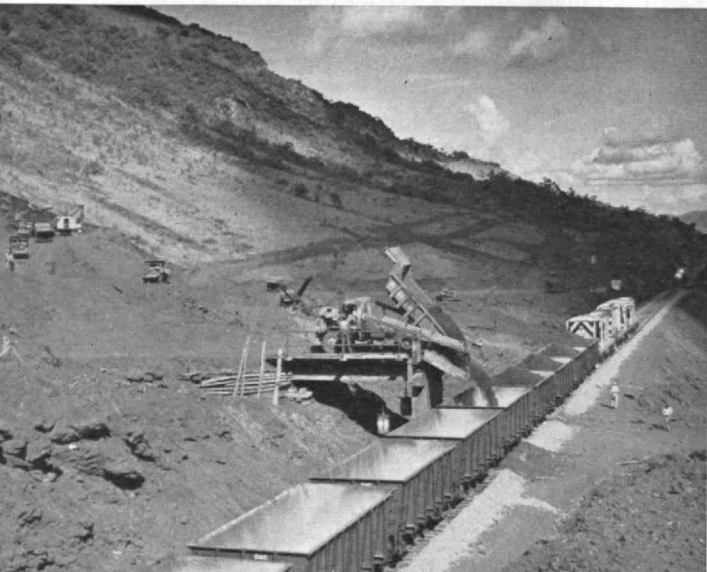
Hydraulic dredges dropped their cutter heads to the river bottom and sucked up sand and silt and pumped it to shore through large-diameter pipe lines floating on pontoons. Altogether, some 33,000,000 cubic yards were disposed of in 19 months of operation, opening up an ocean-going ship channel 250 to 400 feet wide at low water. Pile dikes were placed at critical points to keep the channel from filling in.

Hydrographic survey parties carried out a program of soundings and triangulation. Running back and forth across the river, a team on a motorboat used a fathometer in co-ordination with instrument men on shore, thus charting the channel. Toward the end of 1953 aids to navigation were installed all the way from Puerto Ordaz to the sea. There were 30 beacons at intervals along the shore and 57 in the stream itself, plus 30 floating buoys.

It was a red-letter day when the freighter *Paul Honold* arrived at Puerto Ordaz in November, 1953, although many ships had preceded her since the caisson dock was completed in 1952. What gave special significance to the coming of the *Paul Honold* was that she was an ore-carrier, the first to be berthed here, and would soon take her place with others in the transporting of Cerro Bolivar iron ore. An added significance was that she was now delivering the first consignment of ore cars for the Cerro Bolivar ore-haulage system. There were 62 of them to be off-loaded, of 90 gross tons carrying capacity each. More would be brought later until there were 560. The ore cars heralded the beginning of production, less than two years after the first freight load.

Astonishing changes had taken place along the Puerto Ordaz water front by the fall of 1953. In the course of just a few months, a combination of complex steel structures had risen against the sky. These were the ore-handling facilities, which were now almost ready for operation.

Loading of the first ore train on Cerro Bolivar, November 27, 1953, from a temporary ramp.



To furnish electricity for the ore-handling machinery and all other industrial and domestic needs of the new community of Puerto Ordaz, a powerhouse had been erected on the nearby bank of the Caroni River.

Another vital installation was the permanent water system, which went on stream in mid-November. Water was pumped from the Orinoco River to a modern plant. The volume treated was 1,000,000 gallons per day, which, with a few modifications, could be stepped up to 2,000,000.

Puerto Ordaz had lost much of the rawness of a construction camp. Many of the permanent houses were already built, furnished, and occupied. Eventually Puerto Ordaz, like Ciudad Piar at the mine, would become a full-fledged little city, with recreation buildings, bachelor and family quarters, church, school, hospital, cafeteria, commissary, and laundry. Indeed, the laundry was already in business. It was a wonderful asset in a climate where clothing quickly wilts and soils. Still carrying on in temporary quarters was the Puerto Ordaz school, but its staff and the number of its pupils had grown with the coming of more and more resident families.

In the Puerto Ordaz yards, complete and up-to-date shops were being built. Here all major mining and operating equipment, including rolling stock, would be kept in condition.

All this time, the rail ore-gathering system between Puerto Ordaz and Cerro Bolivar was nearing completion. Of great importance to it was a rock quarry a few miles south of the Orinoco. Blasted granite was dumped into a primary crusher from which it was conveyed to a secondary crusher. The plant produced aggregate for concrete, and ballast for grades on the haulage system. From a pit beneath a stockpile of ballast a belt brought up carload after carload through a tunnel to a loading ramp.

The roadbed was finished, but ballast cars continued their work, hauling crushed rock for the final grading of the track. Altogether, some 425,000 cubic yards of rock of all sizes had been produced and sent out from the quarry. After the spreading of the last ballast, the shoulder of the roadbed was evened off by a special plow. Just behind, a pair of power jacks lifted the track to its final position. An electric multi-tamper followed the power jacks, its steel fingers probing into the ballast and compacting it. The rails were moved into precise alignment under the guidance of an instrument man. The track was standard gauge and the rail came in 39-foot lengths, weighing 132 pounds per yard for the main track. The rail system was now virtually finished except for sidings on the hill itself. Where the roadbed wound to the crest of Cerro Bolivar, it was found economical to use local iron ore as ballast rather than ordinary rock.

Among the visitors who observed progress at Cerro Bolivar was Clifford F. Hood, U. S. Steel's President, who arrived with a party of executives in mid-November, 1953. Guiding Mr. Hood's party was Francis Thomas, new President of the Orinoco Mining Company. Stephen D. Bechtel, chairman of the board of Constructora Bechtel, managing construction for Orinoco, inspected the project on a number of occasions,

(Continued on page 362)

Food of Our Colonial Forefathers

*Although Ill-Fed, by Modern Standards,
Colonial Settlers Had the Initiative and Energy
To Carve a Great Country from out of the Wilderness*

By HARRY W. VON LOESECKE

ON November 15, 1620, the *Mayflower* arrived at Cape Cod, and Captain Miles Standish with 16 well-armed men went ashore to find a suitable place for their companions to land. What they saw was a dreary countryside —

Washed with a cold gray mist, the vapory breath of the east-wind,
Forest and meadow and hill, and the steel-blue rim of the ocean
Lying silent and sad, in the afternoon shadows and sunshine.^{1*}

Yet in this dismal wilderness which seemed to offer them nothing, they turned forward with confidence, and when the next autumn approached they could look back with some measure of satisfaction:

Seven dwelling houses and four public buildings on the main street were the outcome of their patient toil. Of the latter, one served for worship and for town meetings, the others for storehouses for provisions, clothing, trading stock and general supplies. They were at peace with the Indians round about; with some of them, indeed, on terms of intimate friendship. They resolved, therefore, with public proclamation to keep what may be called their Feast of Tabernacles. Besides the abundance of waterfowl, wild turkeys and venison, they had about one peck of corn meal per week to a person, which caused many to write their friends in England of their good cheer.²

Nevertheless, for three years the Plymouth Colony was on the verge of starvation, and maintained life only by strict rationing of its grain, by purchases from the Indians, and by making extensive use of fish, game, and wild food plants.

Despite the scattered settlements of fishermen and that of the Pilgrims at Plymouth, historians believe that the real founding of New England and the New World may be dated from 1630 when 2,000 well-equipped settlers arrived on the shores of what is now Boston Harbor. By 1640, the population of the New England colonies had risen to about 18,000.³

William Wood, writing of life in the early colonies around 1635, says:

Surely that place is not miserably poore to them that are there, where foure Egges may be had for a Penny and a quart of new Milke at the same rate: where Butter is six pence a pound and Cheshire Cheese at five pence . . . can they be very poore, where for foure thousand

soules,†there are fifteen hundred head of cattle, besides foure thousand Goates, and swine innumerable.⁴

Corn (gunney wheat, Turkey wheat) was the most unfailing and valuable food supply of the early settlers, who found it "more precious than silver" and even used it as a medium of exchange. Every cleared patch of land contained corn, and

Round about the Indian village
Spread the meadows and the cornfields.⁵

Taught by the Indians, the colonists planted corn in hills, the same number of stalks to each hill, and used fish as fertilizer. Yields amounted to around 20 to 25 bushels per acre, which is about 10 bushels per acre less than the modern farmer gets, assuming that a bushel in colonial times was the same as it is today. When the hills of corn were heavily enriched with fish, yields as high as 40 to 50 bushels per acre were obtained. Pumpkin vines would be found running among the hills, and beans climbing the cornstalks.

John Josselyn, an English traveler to New England in 1638 and again in 1663, describes the corn of that time and some of its uses in food dishes:

Indian wheat, of which there are three sorts, yellow, red and blew; the blew is commonly Ripe before the other a Month . . . The decoction of the blew corn is good to wash sore Mouths with: It is light of digestion, and the English make a kind of Loblolly [a thick gruel] of it to eat with Milk, which they call Sampe;‡ they beat it in a Morter and sift the flower out of it; the remainder they call *Homminey*, which they put in a Pot of two or three Gallons, with Water, and boyl it upon a gentle Fire till it be like a Hasty Pudden; they put this into Milk, and so eat it. Their Bread also they make of the *Homminey* so boiled, and mix their Flower with it, cast it into a deep Bason in which they form the Loaf, and then turn it out upon the Peel, and presently put it into the oven before it spreads abroad; the Flower makes excellent Puddens.⁶

At first corn was ground at home by pounding in a mortar. Hominy was sometimes made by boiling the corn kernels with leachings of wood ashes, these leachings being boiled down to the point where they could support an egg.

† This figure does not check with that given by Adams (cf. reference 3).

‡ This is apparently the name given by the Algonquin family of Indians. The Narraganset tribe of the Algonquins called it *nasaump*. Other names were *asapan*, *supaton*, *sepawn*, *sepon*, *suppaw*, depending upon the tribe.

* Please see numbered references, pages 360, 362.



Ward Allan Howe

Immortalized by Longfellow's Tales of a Wayside Inn is this reminder of colonial days, at Sudbury, Mass.

Later, hand mills, called querns (which consisted of two circular stones, one above the other) were utilized. The upper stone was turned by hand. Further improvements made use of windmills erected on the hills around Boston to catch the breeze. The huge vanes of these clumsy mills, creaking in the wind, were the source of awe and wonder to the Indians, who attributed their workings to some mysterious power held only by the white man.

Mills run by water and tide power were in use beginning about 1633 when a water mill was erected in Roxbury, and in 1634 another was built at Stoughton. It was not long before mills were scattered about the vicinity of Boston at Watertown, Dedham, Wayland, Sudbury, Reading, and Charlestown. Since these corn-grinding mills were situated on the banks of running water and on marshlands, they were difficult, and often dangerous to reach. One trip to such a mill, that ended in tragedy, is described by John Winthrop in his diary under date of 1646:

A woman of Charlestown having two daughters aged under 14 years, sent them to the tide mill nearby with a little corn. They delivered their corn to the mill and returning back (they dwelt towards Cambridge) they were not seen till three months after, supposed to be carried away by the tide which was then above the marsh.⁷

Besides using corn as *sampe*, it was mixed with rye flour to make "rye and Injun bread"; *Sukquittahash* (also called *misickquatash*), "corn seethed like beans," was another favored dish. From this we got our modern succotash, which today in commercial food processing means a mixture of corn and lima beans. In colonial times, however, succotash was made from corn and horticultural beans, and even today in New England succotash is considered a mixture of fresh corn and horticultural beans, salt pork, milk or cream, and butter.

John Winthrop (the Younger), who became Governor of Connecticut in 1635, and was a member of the Royal Society of England, carried out considerable experimental work with corn. He used corn for brewing beer, and called attention to the possibilities of making sugar and sirup from cornstalks, a thought that was revived even as late as 1852 in this country. Winthrop reported his results in "Description, Culture and Use of Maize," published in 1678.⁸

The art of preparing "roasting ears" was obtained from the Indians. They would "lap their corn in rowles within the leaves of the corn and so boil it for a dainty."

Wheat was another cereal crop of the early colonies. The crop began to fail in eastern Massachusetts before 1700, and by the end of the Eighteenth Century had practically disappeared from the state. Black stem rust and the Hessian fly took their toll. The cereal, however, grew well in the middle colonies where yields of from 10 to 15 bushels per acre were obtained. The failure of the wheat crop in eastern Massachusetts made it necessary for Boston to import grain from Connecticut and western Massachusetts, but such supplies soon became unreliable, and by 1750 breadstuffs were being regularly imported from New York, Philadelphia, and Baltimore. By 1790, flour was even being imported into the former exporting regions of the Connecticut Valley.

Grain Threshing

In the late Seventeenth Century, grain in New England was usually threshed with a flail, but in the middle colonies during the Eighteenth Century the general practice was to tread out the grain with horses. Two men and six horses could thresh about 100 bushels a day. Winnowing was performed by throwing the grain against the wind, and by running it through sieves. In 1780, horsepower threshing was experimented with, but practical application did not result until considerably later. About this same time, one miller in Philadelphia mechanically conveyed his grain from one part of the mill to another while it was being cleaned, ground, bolted, and packed. Capacity of his mill was said to be 100,000 bushels a year.⁹

There were apparently no professional bakers in the early Plymouth Colony, and the first baker in the New World seems to have been a William Hudson, who settled in Boston around 1640.¹⁰ In the same year an act was passed making it unlawful to make bread "finer than to afford at twelve ounces the two-penny loaf," and in 1646 the first general law governing the price of bread and regulating the acts of the baker was passed. So, price control in the United States is nothing new. A more explicit act was passed in 1720; it was repealed in 1797.

Some pretense was even made to establish standards of identity, for in 1763 a Boston law required that brown bread not exceed one-half Indian meal. Just how such a law could be enforced, with the limited knowledge of food technology of that day, is difficult for us now to understand. There was no uniformity in the composition of bread, nor in its price, throughout the colonies. Thus, Benjamin

Franklin in his autobiography makes this apparent by a Philadelphia experience:

Then I walked up the street, gazing about till near the market-house I met a boy with bread. I had made many a meal on bread, and, inquiring where he got it, I went immediately to the baker's he directed me to, in Second-street, and ask'd for bisket, intending such as we had in Boston; but they, it seems, were not made in Philadelphia. Then I asked for a three-penny loaf, and was told they had none such. So not considering or knowing the difference of money, and the greater cheapness nor the names of his bread, I had him give me three-penny worth of any sort. He gave me, accordingly, three great puffy rolls. I was surpriz'd at the quantity, but took it, and, having no room in my pockets, walk'd off with a roll under each arm, and eating the other.

Fairs and markets were established in Philadelphia in the early years of the settlement. These institutions were designed to bring the producer and consumer together under conditions of free competition and to prevent abusive practices of the middleman. In 1693 market regulations were set up which were not always popular with the producer. A weekly market was established in Hartford in 1643 and annual fairs held there and in New Haven and Providence. A 1709 writer making an observation of the Boston market says: "The Town of Boston is plentifully supply'd with good and wholesome Provisions of all sorts, not inferior to those in England."

Rye and barley were also raised in the colonies, the former being quite often mixed with corn and wheat to make "rye n' Injun" bread. The rice plantations of the southern colonies, however, were the El Dorados of the southern settlers. Huge fortunes, reflected in the splendor of the magnificent homes and genteel living of the plantation owners, were derived from rice growing. The Virginia colonists experimented with rice growing in 1647, but this never resulted in the establishment of a rice culture of any consequence. Rice was cultivated in South Carolina near Charleston prior to 1685, later its cultivation expanded into southeastern South Carolina and then northward to the northeastern part of the state and along the lower Cape Fear River in North Carolina. Georgia was another rice-growing colony, and rice production expanded rapidly in all the southern colonies until 1775, when annual exports approached some 66,000,000 pounds.

Rice Growing

Most rice growers of the colonial period cut their rice with a sickle. The harvested rice was bound in bundles, carried to the barnyard, and stacked until the threshing season. Threshing was done with a flail. The husks were removed from the grain with mortar and pestle, and the chaff was blown off with hand fans. Water mills came into use in 1787, and tide mills around 1791. It was not until 1832 that millstones were used.

The colonials had plenty of vegetables in the summer. Cabbage, lettuce, carrots, parsnips, beets, pumpkins, squash, radishes, turnips, purslane, "pease (of all sorts, and the best in the World)," and beans.



Arthur Griffin

"They resolved, therefore, with public proclamation to keep what may be called their Feast of Tabernacles."

Sweet potatoes were extensively grown in the southern colonies, for the colonists there preferred them to corn. Such vegetables as turnips, pumpkins, squash, and parsnips were stored or dried for winter use. Excess turnips and parsnips were fed to livestock.

Shredded cabbage dressed in vinegar was evolved by the Dutch settlers of Manhattan. We know this dish today as coleslaw. Baked beans as a New England dish, which survives to this day, was born in colonial times as an expedient to eliminate cooking on Sunday, a day given over to rest and prayer. The beans were baked with salt pork and molasses all Saturday, so as to be ready to be served on the Sabbath.

It was not until the beginning of the Eighteenth Century that potatoes started to find favor in the New World. Benjamin Franklin mentions them in his autobiography of his early youth, when in 1722 he had a fling at being a vegetarian: "I made myself acquainted with Tyron's manner of preparing dishes, such as boiling potatoes or rice, making hasty pudding, and a few others . . ." Tyron was apparently a food faddist of the time who recommended a vegetable diet. Potatoes must have been well known in England during the Seventeenth Century, for the dupe Falstaff, in Shakespeare's *Merry Wives of Windsor*, shouts: ". . . Let the sky rain potatoes . . ." ¹¹

Introduced into the Carolinas by the Scotch-Irish colonists in 1718, it was not until after the Revolution that potatoes came into general use as a food in New England, and later in New York and Pennsylvania.

The early settlers had a considerable variety of fruits during the season, but in winter their diet of fruit was limited chiefly to apples, either as such or as cider. In early summer wild strawberries were plentiful in New England, and in such abundance "that the Fields and Woods are died red." Josselyn,

in his travels in 1638 in New England, was impressed by the wild fruit:

Bell Berries, they usually eat them put into a Bason, with milk, and sweetened a little more with sugar and spice, or for cold stomachs, in Sack. The Indians dry them in the Sun, and sell them to the English by the Bushell, who make use of them instead of Currence, putting them into Puddens, both boyled and baked, and into water gruel.⁶

Also known to early settlers were the wild cherry [probably the chokecherry (*Prunus virginiana*) and the wild black cherry (*P. serotina*)] and the "Plumb Tree, several kinds, bearing some long, round, white, yellow, red and black. Plums; all differing in their fruit from those in England."⁶

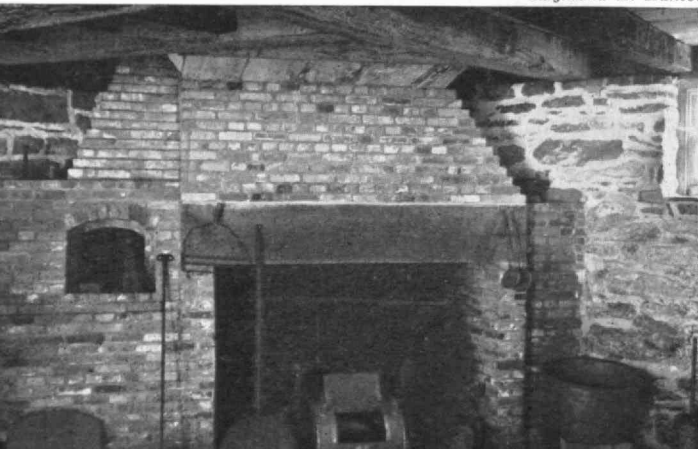
Cherries and plums were sometimes preserved for winter use by packing in large stone jugs, well filled and made "proof against air and water." The filled jugs were sunk in the bottom of a cold spring.¹²

As early as 1639, apples were grown on Governor's Island in what is now Boston Harbor. In 1753, apples, pears, peaches, plums, quince, cherries, and crabapples were introduced into South Carolina and north Georgia. Apples were utilized in New England chiefly for making cider, the common drink of all its inhabitants. (This implies the fermented juice. There were no means of keeping the juice from fermenting.) The dark, cold cellar of most every house, whose dwellers were financially situated to own a house with a cellar, contained at least one barrel of cider. Pitchers of it were brought up at every meal and in the morning and evening. Even the children were allowed cider mixed with milk when the latter was scarce. As early as 1638 Josselyn reported: "Syder is very plentiful in the countrey ordinarily sold for ten shillings a hogshead."⁶ The Puritans drank switchel, a mixture of molasses, vinegar, and ginger water; while the Swedish settlers of Delaware, New Jersey, and Pennsylvania preferred sillabub, which consisted of lukewarm milk, wine, and sugar. Apples were also sliced and dried, and cider brandy (applejack) was prepared by distilling the fermented juice. There was no Internal Revenue Service in those days.

Peaches were grown around New York and in New Jersey and Pennsylvania. The bitter New England winters prohibited extensive growing in that region. In Pennsylvania, peaches were sliced and dried for winter use.

Many a colonial meal was cooked in fireplaces such as this one in the birthplace of Gilbert Stuart.

Raymond E. Hanson



The colonists in the New World found many serious plant diseases, such as fire blight of pear and apple, and downy mildew of grapes. Little attention was given to cultivation, pruning, and control of insect pests. As a result, most of the orchards were in a continuous state of slow death. Entomology was practically an unknown science in the New World, as it was not until between 1734 and 1742 that the French naturalist René de Réaumur issued his *Memoires pour Servir à l'Histoire des Insectes*, in six volumes. These books were probably little known to the colonial fruit growers.

In 1750, William Prince began to develop a commercial fruit tree nursery at Flushing, Long Island. This venture grew to be the first extensive collection of fruits in the United States. At the close of the Revolution, George Morgan settled on a farm which is now a part of Princeton University, where, among other activities, he experimented with methods of insect extermination. The role of George Washington and Thomas Jefferson in scientific farming during the colonial period is too well known for further discussion.

Besides wild game that abounded in the forests, the diet of the early colonists was supplemented by beef, pork, lamb, and mutton. The raising of beef cattle and livestock for sale began very early, and in 1655 salted meat was being shipped from the colonies to the West Indies. Farmers in the rural districts drove their cattle to slaughter houses in Brighton, Mass., New York, and Philadelphia. There is still a slaughter house at the same site in Brighton, but of course it is now modernized.

Use of Cattle

Cattle were allowed to roam at will for feeding and there was little provision for their shelter or food during the winter. Consequently, cattle raising in the northern New England colonies was not successful, but in southern New England (around Narragansett Bay where the climate was milder), the venture was quite successful. The mild climate of the southern colonies encouraged cattle raising, and cattle became so plentiful there they were hunted, at times, like deer.

Swine were fed kitchen garbage and allowed to forage in the woods for nuts. In most of New England, hogs were slaughtered at 18 months when they weighed about 200 pounds, but in eastern Massachusetts they were generally slaughtered when they weighed between 250 and 400 pounds. As early as 1660 a profitable pork packing trade for the West Indies developed in the Connecticut Valley.

Sheep were numerous in New England, and in 1645 the Bay Colony towns of Massachusetts were encouraged to raise sheep, chiefly for their wool, for lamb was not a very popular meat. The typical sheep of those days may have stood two and a half feet high and dressed out at from 10 to 15 pounds per quarter, or exceptionally, at 20 pounds.¹³

In 1789, land was cheap and meat abundant in the American colonies. Corn was fed to cattle and hogs so that the colonists could enjoy the meat. But in
(Continued on page 352)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

National Economy and Physics Teaching

WHEN 112 members and guests attended the 309th meeting of the Alumni Council on the evening of March 28 they had opportunity of hearing Eli Shapiro, Professor of Finance and Associate Dean of the School of Industrial Management, speak on the nation's economy; they also heard Nathaniel H. Frank, '23, Head of the Department of Physics at M.I.T., speak on instruction in physics. Hugh S. Ferguson, '23, opened the Council meeting as president of the Alumni Association by calling for reports on Council business.

As Secretary of the Alumni Association, D. P. Severance, '38, announced changes in class affiliation for two Alumni, and stated that for the month ending March 28, eight members of the Council had visited 10 alumni clubs in Tokyo, Monterrey, and Mexico City, as well as in seven cities in the United States.

Dwight C. Arnold, '27, has accepted chairmanship of a committee to plan a conference at the Institute of such working personnel of the Association as club officers, class officers, honorary secretaries, and members of the Educational Council. Such a conference, which will probably be held in mid-September, would provide opportunity for these Alumni to discuss common problems on the campus where they may come into close contact with present day facilities which the Institute has to offer. Such a conference for the Institute's unofficial ambassadors of good will would help to publicize facilities that have been developed in the postwar era and which may not be well known to those who have not visited Cambridge in recent years. John J. Wilson, '29, will be deputy chairman, and other members of Mr. Arnold's Committee are: Theodore T. Miller, '22, John E. Burchard, '23, Henry B. Kane, '24, Bruce F. Kingsbury, '24, George R. Harrison, and H. E. Lobdell, '17, ex-officio, Hugh S. Ferguson, '23, ex-officio, D. P. Severance, '38, ex-officio.

John A. Lunn, '17, a member of the Alumni Fund Board, reported that, as of the March 28 Council meeting, 9,200 Alumni had contributed a total of \$342,000 toward the laboratory in physical sciences to be built as a memorial to Karl T. Compton. These figures represent 400 more contributors than last year at the same time, and the amount exceeds last year's final figure by \$108,000.

President Ferguson then called on Dr. Shapiro who discussed the nation's economy and business climate. He told of the role each can play, their relative effectiveness, ease of operation, and illustrated how each had been used in the past and showed that there is no necessary conflict between physical policy and monetary policy.

As final speaker for the evening, Dr. Frank told the Council of the state of undergraduate physics

instruction at M.I.T. In particular, he told of the changing emphasis in first and second year physics laboratory from the multiplicity of routine experiments formerly required to the present requirement for few laboratory experiments but each designed to emphasize modern physics without requiring the student to have a greater knowledge of that subject. The undergraduate physics instruction does not attempt to cover a specified storehouse of factual data. On the contrary, the fundamental core of the course is now determined by the individual classroom instructors and the individual laboratory instructors, with a tendency to take physics back to the area of an experimental science and away from the category of a blackboard subject.

Even though there are 1,900 freshmen and sophomores all taking physics, and an additional 300 undergraduate physics students and 200 graduate physics students, this teaching is shared by senior members of the faculty and by experienced research men. For example, of the 66 sections in the first two years of physics, only seven sections are handled by graduate student assistants. All other sections are taught by members of the faculty and other post-doctoral staff members.

Following a question period, the members of the Council had the opportunity to preview the film "New Horizons" illustrating industrial applications of electronic and nuclear science as well as important activities of the Institute in these fields.

Wright Lecture

C STARK DRAPER, '26, Head of the Department of Aeronautical Engineering at the Institute, will deliver the 43rd distinguished Wilbur Wright Memorial Lecture in London, England, on Thursday, May 19. The Royal Aeronautical Society of England has announced plans for the lecture and for a reception to follow it. Dr. Draper will speak on "Flight Control," discussing the subject from its beginnings in historical aircraft to the high-performance systems of today. Trends in both theory and practice will be described as parallel streams of development.

During the past 15 years Dr. Draper's research at M.I.T. has won him national and international recognition. Many developments in anti-aircraft fire control and air-borne fire control equipment made under his supervision in the M.I.T. Instrumentation Laboratory are today in wide use by both the U.S. Air Force and the U.S. Navy. Dr. Draper has written extensively in the fields of instrumentation and control, has served as consulting engineer to many aeronautical and instrument companies and holds a number of patents for measuring and control equipment.

Before 1922, when he came to the Institute as an undergraduate, Dr. Draper studied in the schools of

Windsor, Mo., where he was born in 1901, and at the University of Missouri and Stanford University. He has been at M.I.T. continuously since 1922 becoming professor of aeronautical engineering in 1939 and head of the Department in 1951.

In 1946 Dr. Draper received the Medal for Merit and the Naval Ordnance Development Award for his wartime work in antiaircraft fire control. He holds the Sylvanus Albert Reed Award of the Institute of the Aeronautical Sciences, the New England Award of the Engineering Societies of New England, and a Testimonial of Appreciation from the Industrial Instruments and Regulators Division of the American Society of Mechanical Engineers. The Exceptional Civilian Service Award from the Department of the Air Force was made to Professor Draper by the Department of the Air Force in 1951, in recognition of distinguished service during the period 1947-1950.

Conserving Our Resources

How to plan for wise and efficient use of America's bountiful human and natural resources, to help end wasted riches and underemployed abilities, will be the subject of intensive research at the Institute during the next five years. Pietro Belluschi, Dean of M.I.T.'s School of Architecture and Planning, announced that a grant of \$93,750 from Resources for the Future, Inc., will underwrite a five-year study at M.I.T. of the principles and methods of analyzing resource problems. The project will be in M.I.T.'s Section of Urban and Regional Studies in the Department of City and Regional Planning. It will be under the direction of Walter Isard, Associate Professor of Regional Economics. The results of this study — new ways to plan industrial expansion and human activities in terms of the resources available — should be useful, Dean Belluschi said, to numerous industries as well as to the local, state, and national government agencies.

In speaking of the new project, Dr. Isard pointed out that "America's continuance as a dominant economy of the world is contingent upon attaining a wise and efficient use of both God-given and man-made resources. The history of our country is replete with mistakes. With tremendous advances in technology and in forms of social organization, society has become increasingly complex. What principles and methods can we now use," asked Dr. Isard, "to plan intelligently and comprehensively to make the resources we have serve us most effectively?" These, said Dr. Isard, are typical of today's resource-planning questions: (1) How can we develop a program of water use over the next decades which will meet needs and be within our supplies? (2) How can we devise a transportation system — harbors, rivers, highways, airports, railroads — which will minimize congestion and permit low costs? (3) How can we achieve effective housing programs and urban rehabilitation and renewal?

"It is widely recognized among social scientists," continued Dr. Isard, "that our present methods of analysis are inadequate to cope with problems of this order . . . and our problems are steadily mounting in complexity." As an example, a comprehensive

policy for future development of water resources in a region, Dr. Isard said, might require as a basis: (1) Estimates of future production, income, population, expenditures, and capital movements for the region involved. (2) Estimates of the future distribution of urban and rural population of the region, and of the geographic spread of industry within the region. (3) Estimates of the local demand for the product of each water-consuming industry. (4) Estimates of the needs by industries and population outside the region for the products of the region's industries. (5) Estimates of future water supplies, from all sources, for the region as a whole, and also for each local area which might be a potential water shortage area.

"Present methods of analysis," Dr. Isard said, "are inadequate to make such estimates as these. They involve processes so complicated that we have been able to study them only partially. Our research at M.I.T. will seek the methods by which problems such as these may be comprehensively attacked. New principles and methods must be developed if industries and governments are to achieve wiser resource policies." The study will involve the use of such new analytical tools as linear programming, industrial complex analysis, operations research, inter-regional input-output analysis, game theory, and gravity models. These are new analytical developments in economics and mathematics which are unfamiliar to most planning people. Their use is made possible by the development of such high-speed computers as M.I.T.'s Whirlwind I.

The subject of regional resource development is one of the major elements in the program of the Section of Urban and Regional Studies at M.I.T. Other studies under way include analysis of the "cityscape" — to develop principles and techniques to be used by architects and planners in designing a more satisfactory environment; regional analysis of industrial location; and the interrelationship of transportation and land development patterns of metropolitan regions. Resources for the Future, Inc., is a nonprofit, tax-exempt corporation, with headquarters in Washington, D.C. It was established in October, 1952, with the co-operation of The Ford Foundation. Its purpose is to improve the development, conservation, and use of natural resources through programs of research and education, in the social sciences.

Irvin S. Cohen: 1917-1955

THE death of Irvin S. Cohen, for seven years an assistant professor of mathematics at M.I.T., occurred in New York on February 14, 1955. Professor Cohen, on leave of absence at Columbia University since last July, had published a number of papers in the fields of algebra and algebraic geometry and had frequently been an invited speaker at colloquia at other universities.

He was born in Baltimore, Md., and received the degrees of bachelor of arts (1936) and doctor of philosophy (1942) at Johns Hopkins University. Before joining the Institute staff, Professor Cohen had served as Pierce Instructor at Harvard University, and instructor and assistant professor at the University of Pennsylvania.

Litchfield Honored

As reported on these pages last month, Paul W. Litchfield, '96, chairman of the Board of the Good-year Tire and Rubber Company, was honored at the banquet held in Cleveland on February 26 as part of the Third Midwest Regional Conference.

He is shown, at the right, receiving the certificate from Hugh S. Ferguson, '23, President of the Alumni Association which "honors Paul Weeks Litchfield, '96, who, in his Industrial Voyage, has exemplified to the fullest degree the creative and humanitarian roles of the engineer."

Mr. Litchfield also received a set of commemorative Wedgwood plates showing scenes at M.I.T.



Rebman Photo Service



Among those attending the banquet at the Third Midwest Regional Conference in Cleveland on February 26 were: Manson Benedict, '32, Professor of Nuclear Energy, Paul W. Litchfield, '96, honored guest, John E. Burchard, '23, Dean of Humanities, and William H. Robinson, Jr., '24, toastmaster. Speakers at the banquet included Richard S. Morse, '33, and Dean Burchard.

Commencement Speaker

SIR ROGER MAKINS, British Ambassador to the United States, will be the principal speaker at commencement exercises at the Institute on June 10. Sir Roger, who was appointed Ambassador to the United States in 1952, has been in the British foreign service since 1928. He holds the rank of Knight Grand Cross of the Order of St. Michael and St. George and is a Knight Commander of the Most Honorable Order of the Bath. Lady Makins is the former Alice Davis, daughter of the Honorable Dwight F. Davis, Secretary of War in the Coolidge administration, later Governor-General of the Philippines, and the donor of the Davis Cup (tennis).

Sir Roger was educated at Winchester and at Christ Church, Oxford, graduating with First Class honors in history in 1925. In the same year he was elected a fellow of All Souls College, Oxford, and two years later was admitted to the Bar. In 1928 he forsook the law for the foreign service. His first overseas assignment was in Washington, where he served as third, and later as second, secretary from 1931 to 1934. From 1934 to 1942 Sir Roger was in the Foreign Office in London, acting as adviser on League of Nations Affairs, as secretary to the British delegation at the Evian Conference and to the Inter-Governmental Committee on Refugees, and in 1941 making a trip to New York for the International Labor Organization Conference.

In 1942 he was promoted to counsellor and assigned to the staff of the Resident Minister in West Africa. From 1943 to 1944 he was assistant to the Resident Minister at Allied Headquarters Mediterranean Command, first at Algiers and later at Caserta. During this tour of duty he worked in close association with the staff of the Supreme Commander, General Eisenhower, and his successor, Field Marshal Wilson. At the end of the war Sir Roger was named economic minister in Washington, and during the next two years he represented Great Britain at a number of conferences, including the Food and Agriculture Organization and the United Nations Relief and Rehabilitation Administration. Returning to the Foreign Office in 1947, he remained based in London for the next five years, first as assistant, then as deputy under-secretary of State. It was in this post that Sir Roger assumed responsibility for supervising the Economic Departments and later also the North American Department.

During this time, he undertook a number of overseas missions. He attended the Commonwealth Conference in Ceylon in 1950, at which the Colombo Plan was launched. Two years later he was sent by the Foreign Secretary on a special mission of inquiry to the Persian Gulf area. In this period he also paid three visits to the United States: in 1949 with Ernest Bevin and Sir Stafford Cripps; in 1950 with Clement Attlee; and in 1952 with Winston Churchill and Anthony Eden.

Student Conference

STUDENTS and deans from all sections of the country represented 80 colleges at the three-day intercollegiate conference on "Selectivity and Discrimination in American Universities" at the Institute on Friday, March 25. Frederick May Elliot, President of the American Unitarian Association, and James R. Killian, Jr., '26, President of M.I.T., delivered the opening speeches on Friday afternoon at the Kresge Auditorium. Everett C. Hughes, Chairman of the Department of Sociology at the University of Chicago and John Hope Franklin, Professor of History at Howard University, discussed the discrimination problems on Saturday morning.

The Saturday afternoon session was featured by a panel discussion on "Contemporary Attitudes and Viewpoints" with Ralph McGill, editor of the Atlanta, Ga., *Constitution*; Clarence Berger, Dean of Administration at Brandeis University; Jonathan W. Daniels, editor of the Raleigh, N. C., *News and Observer*; and Louis M. Lyons, curator of the Nieman Fellowship at Harvard University. On Sunday morning Carl R. Woodward, President of Rhode Island University, and Eugene S. Wilson, Dean of Freshmen at Amherst, presented their views on restrictive clauses in fraternal organizations. The final plenary session on Sunday afternoon was addressed by John Ely Burchard, '23, Dean of Humanities at M.I.T. The conference was planned by M.I.T. students to develop an understanding of the causes and the problems created by the existence of discriminatory practices in some American colleges. It brought into contact 200 students, administrators, and professors to discuss these questions in small discussion groups.

Creativity and Science

CHARLES A. THOMAS, '24, President of the Monsanto Chemical Company, delivered the 1955 Arthur Dehon Little Memorial Lecture at the Institute on Tuesday, April 12. Dr. Thomas spoke on "Creativity and Science" in the eighth in this series of distinguished lectures. Open to the public, the lecture was delivered in the Kresge Auditorium at M.I.T. at 8:30 P.M. Dr. Thomas has achieved distinction as a chemist, as an administrator, and as a statesman. Dr. Thomas was a pioneer in the development of tetraethyl lead, now used widely in motor fuels; since 1936, first as research director, later vice-president, and now president of Monsanto, he has been responsible for the Company's technical direction and research.

Born near Lexington, Ky., in 1900, Dr. Thomas attended Transylvania College before coming to M.I.T. in 1920; here he received the master of science degree in chemical engineering. His industrial career began with service as a research chemist at the General Motors Research Corporation and later with the Ethyl Gasoline Corporation. Dr. Thomas, together with an associate, organized in 1926 the Thomas and Hochwalt Laboratories; these were acquired 10 years later by the Monsanto Chemical Company, of which Dr. Thomas then became central research director.

During World War II, Dr. Thomas was one of the principal scientists in the development of the atomic bomb, having charge of the final purification and metallurgy of plutonium, the 94th element. He became project director of the Clinton Laboratories at Oak Ridge, Tenn., when the Monsanto Chemical Company contracted to operate this project. In recognition of his wartime work on atomic energy, Dr. Thomas was one of a group of scientists who received the Medal for Merit in 1946; the citation, in part, said that "his initiative and resourcefulness and his unselfish and unswerving devotion to duty have contributed vitally to the success of the atomic bomb project."

Dr. Thomas' work as one of five coauthors of the so-called Acheson-Lilienthal report on the international control of atomic energy typifies a role of outstanding public service. He has been chairman of the Scientific Manpower Advisory Committee of the National Security Resources Board and is now one of seven consultants on President Eisenhower's National Security Council. Dr. Thomas holds the Industrial Research Institute Medal for outstanding achievement in the administration of industrial research and the American Institute of Chemists' Gold Medal for work in research administration. He has been president and chairman of the Board of Directors of the American Chemical Society and in 1953 was presented the Perkin Medal, the highest award for achievement in American industrial chemistry.

The Arthur Dehon Little Memorial Lectureship was established at M.I.T. in 1946 in memory of the founder of Arthur D. Little, Inc. Dr. Little was most widely known as an outstanding pioneer in the application of science to industry. He was a leader in such fields as chrome tanning, artificial silk, water-proof papers, wood-waste utilization, and other industrial chemical operations.

The purpose of the Arthur Dehon Little Lectures is to promote interest in and stimulate discussion of the social implications inherent in the development of science. Previous lecturers have included: J. Robert Oppenheimer, Director of the Institute for Advanced Study, Princeton, N.J.; Robert E. Wilson, '16, chairman of the Board of Standard Oil Company (Indiana); Detlev W. Bronk, President of the National Academy of Sciences; and Leonard Carmichael, Secretary of the Smithsonian Institution.

Newell C. Page: 1880-1955

NEWELL C. PAGE, '02, Professor of Electricity, Emeritus, who served on the M.I.T. staff for 43 years before retiring in 1945, died in Winchester on February 15, 1955. He was 74 years old. Professor Page was born in Newburyport, Mass., and received the degree of bachelor of science at M.I.T. He joined the Institute staff in 1902 as an assistant in the Physics Department, was promoted to instructor two years later, and in 1912 was named assistant professor. Professor Page was appointed associate professor of electricity in 1919, and full professor in 1926.

One of an old school of fine teachers, he devoted his professional life to teaching and to helping his students.

BUSINESS IN MOTION

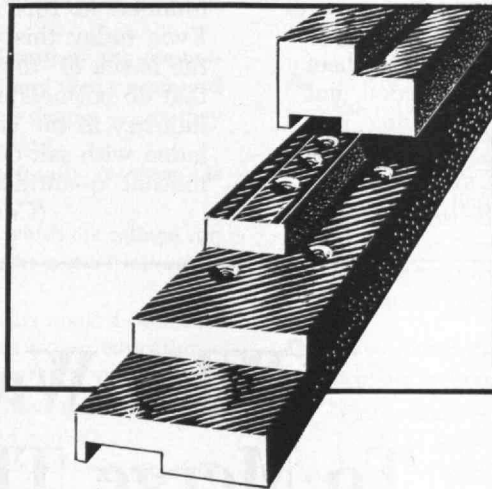
To our Colleagues in American Business ...

These sketches show a Revere Extruded Shape in Copper, and the electrical part made from it. The part, called a "fishtail", is a terminal block on a high-frequency transformer, used in induction heating apparatus. Such equipment produces a high frequency field of sufficient power to heat or even melt metals placed within it. (It is often the case that the coil through which the oscillating currents flow is made of Revere Copper Tube.) Applications of this method of heating are numerous. For example, vacuum tubes are heated by induction to drive air and gases from the metal parts while the vacuum is being established. It is sometimes necessary to cast metal in a vacuum; induction heating makes this possible. The speed, economy and uniformity of the method also make it highly attractive for such tasks as heat-treating and hardening, brazing, soldering, and heating prior to forging, upsetting, or other hot working. This is a fast-growing modern method, and the manufacture of the equipment for it is an industry in itself.

Because it is a part of the electrical industry, it uses a lot of copper. And it has found that Copper Extruded Shapes by Revere contribute to both speed and economy. The fishtail illustrated formerly was machined from solid copper bar. On a typical run, the total manufacturing cost for a certain number of pieces was \$35,000. Because of the considerable amount of transverse milling required, you might

think that an extruded shape would be of doubtful economy. However, analysis indicated that appreciable savings were possible, even though the bar cost 10 cents less per pound. Eventually, these figures came out: using the extruded shape, total cost on the same number of fishtails was \$25,700. That meant a saving of \$9,300, or 26.6%.

Extruded shapes sometimes can indeed work miracles. The shape shown is relatively simple. However,



quite complex shapes are possible, some so complex that they could not be produced by any other method, giving consideration to weight, strength, and cost. Another advantage of the shape is reduction of scrap. In some cases, a finished part is produced merely by cutting pieces off a shape, when scrap almost disappears. The limitation on the extrusion process is this: all design details must be parallel to the axis of extrusion.

But don't let that scare you. The fishtail was finished by a number of operations at angles to the axis, and the shape still saved a lot of money.

Revere would be glad to go into details with you on the application of extruded shapes in copper and copper-base alloys, and aluminum alloys. Perhaps we can help you find ways to new economies. And if you use none of those metals, we suggest that you consult the people from whom you buy your materials. Take them into your confidence and add their knowledge to yours. It should pay you to do so.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Executive Offices: 230 Park Avenue, New York 17, N. Y.

FOOD

(Continued from page 346)

Europe at that time, land was dear and meat a luxury, so Europeans ate bread and other cereals.

There were no means of keeping slaughtered meat fresh for long periods. Therefore, slaughtering was done in the fall when the first frost lay long in the meadows under the morning sun. If the weather turned warm, slaughtered meat was stored in spring houses or wells. Probably there was some natural ice cut locally for local use, but the ice trade in the United States did not start until 1805. The ice trade was initiated by Frederic Tudor of Boston,¹⁴ who started cutting ice from a pond in Saugus — a small town adjacent to Lynn, north of Boston.

Meat in the stage of incipient spoilage was not necessarily thrown away. Robert May, for instance, describes a method of preserving tainted venison:

Boil water, beer and wine vinegar together, and some bay leaves, time, savoury, rosemary and fennel, of each a handful, when it boils put in your venison, parboil it well and season it as aforesaid.¹⁵

Pork was salted for better keeping; a little beef was also preserved by salting. Salt was needed, not only for preserving meat, but for preserving fish. The need for salt tied the frontier settlers to the Atlantic Coast. Many attempts were made to make salt from sea water, and as early as 1620, a saltworks

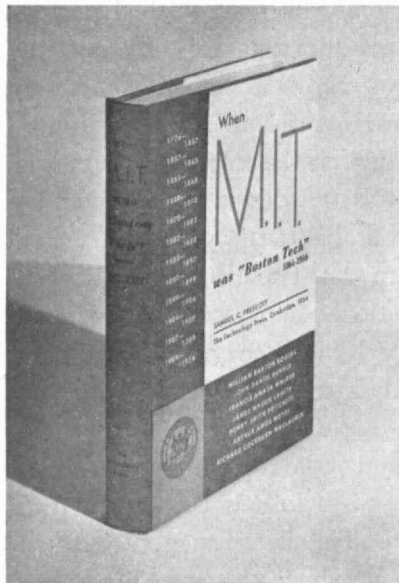
was established at Cape Charles, Va., and in 1625 there was another at Cape Ann in Massachusetts. John Winthrop, Jr., was the leader in these projects, which were unsuccessful, and it was necessary to import salt into the colonies.

During the Revolution, salt was prepared along the Atlantic Seaboard by boiling sea water, and after the close of the war an extensive system of salt making grew up around New Bedford and Cape Cod. These works depended upon solar evaporation. However, at Harwich, Falmouth, and Barnstable on the Cape, salt was made by boiling sea water. It required about 250 gallons of sea water to obtain a bushel of salt. In 1797, extensive salt wells were being worked at Onondaga in New York, and in that year, 25,474 bushels were produced there.¹⁶ Much of the salt made in this period was of poor quality and not well suited for salting pork and fish.

Fish, particularly the cod, brought succor to the early colonists. Codfish was so important to the colonists, that it was reverently designated as the "Sacred Cod." Today, a sample of the Sacred Cod hangs in the State House on Beacon Hill in Boston.

Gloucester, some 30 miles north of Boston, was founded in 1623 for conducting fishing operations. Even today this city on the New England coast is the haven of "they that go down to the sea in ships, that do business in great waters." In 1624, the fishing industry in the colony had so advanced that a ship laden with salt-cured fish was sent to England. Significant quantities of salted fish were soon being

(Continued on page 354)



Who Wanted To Merge The M.I.T. With Harvard?

Read—

When M.I.T. was "Boston Tech"

by Samuel C. Prescott

xviii + 350 pages
with
14 pages of pictures

\$6.00
postpaid

THE TECHNOLOGY PRESS

Room 14N229
Mass. Inst. of Tech.
Cambridge 39, Massachusetts

My check for \$..... is enclosed herewith for copies
of *When M.I.T. was "Boston Tech."* Please mail by prepaid parcel post to:

MORE INFORMATION ABOUT THE CORPORATE ALUMNUS PROGRAM:

A plan to match employees' gifts to their colleges, up to \$1,000 in one year

Since the General Electric Educational and Charitable Fund announced the Corporate Alumnus Program on Nov. 23, 1954, many questions have been received about it. The answers to questions most often asked by G-E employees are reprinted below as a matter of general interest.

Q. Does the Program make any distinction between privately endowed and tax-supported colleges?

A. No. All colleges, which are otherwise eligible, are treated alike, irrespective of their source of support or type of control.

Q. May I also make contributions to any institution from which I earned an advanced degree?

A. Certainly, but the total of all your gifts will be matched only up to \$1,000 in 1955.

Q. Supposing an employee completed part of the requirements for his degree at one college, and then transferred to another from which he received his degree — are they both eligible for "dollar-matching" gifts?

A. No — only the one from which he finally received his degree.

Q. Are there any restrictions on the use which the college can make of the contributions it receives from the Fund under this Program?

A. Practically, no. The payments will be made to the college to foster the over-all purposes of higher education — which admits of a pretty broad interpretation.

Q. To be eligible for the Program, do I have to have worked with General Electric for any specified period?

A. Yes, the rules require you to have had at least one year of continuous service in General Electric or one of its wholly-owned subsidiaries.

Q. What exactly is meant by "earned degree"?

A. You must have at least a bachelor's degree or equivalent. Associate or other short-program "degrees" and certificates do NOT count for eligibility. Nor, for that matter, do honorary degrees.

Q. Are men and women graduate employees equally eligible?

A. Yes.

Q. Is the Program limited to people in special job classifications?

A. Not at all.

Q. When contributing to my alma mater, to whom should I make out my check?

A. It will be helpful if you will make your check payable to the college or university itself, rather than to an alumni association, foundation, or other fund-raising agency. It is the responsibility of the chief financial officer of the institution to certify that the college actually received your contribution. When this is done, the requirements of the plan have been satisfied in this respect. However, making your check payable to the institution is a quicker and surer way of qualifying — but it is not obligatory.

Q. Now, about the eligibility of my college — what specifications is it required to meet?

A. Your college will qualify provided:

1. It is located within the U.S. or its possessions.
2. It is at least a four-year, degree-granting institution.
3. It is accredited by the appropriate regional or professional accrediting association.

HERE ARE THE RULES OF THE CORPORATE ALUMNUS PROGRAM

The Fund will match any contribution, made in 1955 before Dec. 15, by a General Electric employee to a college or university from which he earned a degree, under these conditions:

1. The employee's contribution, in order to qualify under this Program, must be the personal gift of the employee actually paid to the college or university during the calendar year 1955 and prior to December 15 of that year in cash or in securities having a quoted market value and not merely a pledge.

2. The college or university to qualify must be a four-year course, degree-granting institution, accredited by the appropriate regional or professional accrediting association and located within the United States or its possessions.

3. Contributions under the Program shall be employed by the college or university to realize or foster the primary needs and objectives of an institution of higher education, namely, of augmenting the required capital and general operating funds, of providing for expanded student enrollment, of strengthening educational facilities and curricula, and of improving incentives for the highest quality of teaching.

4. The employee at the time of his or her contribution shall be in the active regular employment of the General Electric Company or one of its wholly-owned subsidiaries and shall have had at least one year of continuous service in such employment.

5. The total contribution under this Program with respect to the contribution or contributions of any individual employee shall be limited to the sum of \$1,000 and the total contributions to be made by the Fund under the Program shall not exceed the amount appropriated by the Trustees of the Fund for this purpose. In the event that total employee

contributions otherwise coming within the terms of this Program exceed the amount so appropriated by the Trustees, the contributions to be made by the Fund under this Program may be apportioned by the Trustees in such a manner as they may consider equitable and proper.

6. The Trustees shall be entitled, if they deem it desirable to do so, to suspend, revoke, or terminate this Program at any time with respect to employee contributions thereafter made.

7. Any question, whether as to the interpretation, application or administration of the provisions of this Program or otherwise, shall be determined by the Trustees and their decision shall be final.

For more information write: General Electric Educational and Charitable Fund, Corporate Alumnus Program, Schenectady, N. Y.

Progress Is Our Most Important Product

GENERAL  ELECTRIC

FOOD

(Continued from page 352)

shipped to Catholic countries of the Old World, and cured fish became the colonists' capital resource and stock in trade. Cured fish was used for the purchase of manufactured goods from Europe, and of sugar, rum, molasses, and tobacco from the West Indies.

The fish-curing industry prospered and dominated the economic life of the New England colonies in the late Seventeenth and Eighteenth Centuries. In 1775, the British Parliament passed a bill prohibiting the New England colonies from trading directly with foreign countries. This prevented New England vessels from fishing in the Gulf of St. Lawrence, in the Newfoundland Banks, and on the coasts of Labrador and Nova Scotia. Ruin faced the New England fish-curing industry, and the edict was one of the leading causes of bringing these colonies into the Revolutionary war.

Butter and cheese were made on every farm, but in general they were not of such quality as we know them today. Their manufacture required more care and attention than the ordinary farmer could afford. For this reason, city dwellers throughout the Seventeenth Century (and until the end of the Eighteenth Century) imported at least part of their butter from England and Ireland.

The dairy cow of colonial times was a sorry creature; she was ill-fed and gave little milk. Despite

the low yield, milk was quite plentiful in the northern colonies, but it was scarce in the southern colonies where the heat made it difficult to keep milk fresh. The market for milk was limited by difficulties of transportation, and even in the larger towns, such as Boston, cows were kept by almost every dweller. There the Common was the community grazing area, and the meandering cowpaths to the Common might have been the forerunners of Boston's present winding, narrow streets.

A town officer, known as the "cowherd," drove the cows to the grazing area in the morning and back again at night. Since his duty was to stay with the herd all day, he must have had plenty of time for thinking. Thoreau's statement, "I would rather sit on a pumpkin and have it all to myself than be crowded on a velvet cushion," may have reflected the thoughts of a past cowherd reposing in a sweet-smelling, shaded New England meadow.

Even ice cream was known to the colonials. At a dinner in the first half of the Eighteenth Century given by Governor Bladen of Maryland, William Black records in his journal:

A Dessert no less curious among the Rarities of which it was Compos'd, was some fine Ice Cream which, with the Strawberries and Milk, eat most Deliciously.¹⁷

In 1777, Philip Lenzi, a confectioner in New York, was making ice cream which he advertised in the local papers of the time,¹⁸ and in 1789, ice cream

(Continued on page 356)

MINIATURE CO-AX for AIRBORNE electronics

Where light weight and high performance really count!

-70° to 400° F (continuous service) • Solid dielectric
Flexible construction • Small diameter

BIW #	Jacket	Impedance	O.D.
COX - 2FX - .011 - *		50 OHMS	.075"
COX - 3FX - .011 - *		70 OHMS	.100"
COX - 4FX - .011 - *		90 OHMS	.125"
COX - 2FX - 29 - *		50 OHMS	.080"
COX - 3FX - 29 - *		70 OHMS	.100"
COX - 2FX - 22 - *		50 OHMS	.130"
COX - 3FF - 24CW *		70 OHMS	.125"

* GL—Saturated Glass Braid, 400° F.

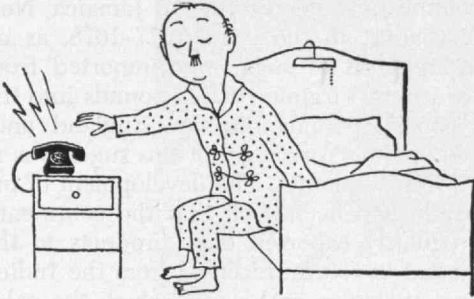
* GV—Teflon Sealer, Saturated Glass Braid, 500° F.

* GF—Teflon Saturated Glass Braid, 550° F.

Boston Insulated Wire & Cable Co., BOSTON 25, MASSACHUSETTS

Telephone Diary

HOUSEWIFE TELLS HOW FAMILY'S TELEPHONES SAVE STEPS, TIME AND WORRY—DAY AND NIGHT



4 A. M. Jack's a sound sleeper but he woke up fast when he heard the news. "It's a boy!" he shouted. "Nearly eight pounds. Mary's fine." Then I talked and Jack talked. Bless that bedroom telephone!



8 A. M. to 11 A. M. Just couldn't wait to tell Betty and Peggy about the baby. Then I ordered Jack's favorite roast for dinner and was lucky to get a hairdresser appointment. A grandmother must keep young!



5 P. M. Wouldn't you know! The very night I have something special for dinner Jack gets held up at the office. But it wasn't too bad. He telephoned he'd be an hour late. It's wonderful to have a telephone in the kitchen.



10 P. M. Such excitement! First Jack Jr.'s baby. Then Alice tells us she's engaged. I wasn't too surprised because of all those telephone calls and dates. I'm so glad it's that nice Bob Johnson.

EVER READY...EVER HELPFUL. Day or night, rain or shine,

the telephone stands ready to help you in the everyday affairs of life as well as emergencies. In office and home, these oft-repeated words

reveal its value—"I don't know what I'd do without the telephone."

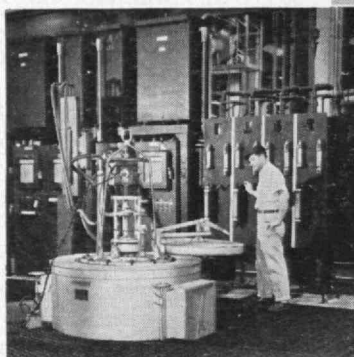
BELL TELEPHONE SYSTEM



HEVI DUTY

Precision Electric HEAT TREATING FURNACES

Industrial

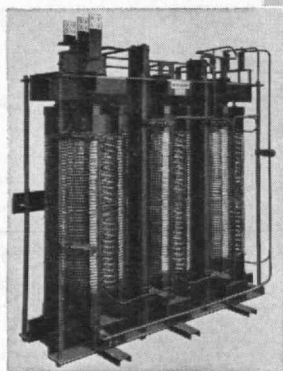


Laboratory

Dry Type
Air-Cooled

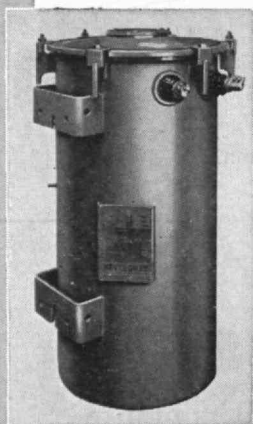
TRANSFORMERS

2 VA to
2000 KVA



Static Type

CONSTANT CURRENT REGULATORS



HEVI DUTY ELECTRIC COMPANY

MILWAUKEE 1, WISCONSIN

Harold E. Koch, '22, President

Elton E. Staples, '26, Exec. Vice President

Chester Meyer, '36, Works Manager

FOOD

(Continued from page 354)

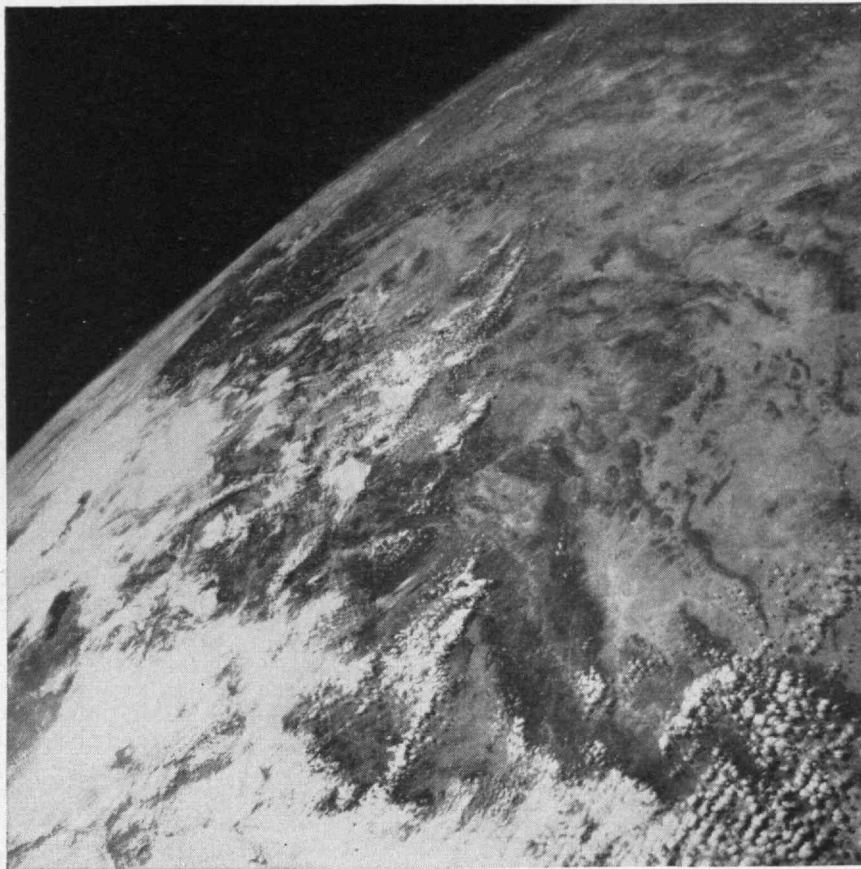
was served at a dinner given by George Washington.¹⁹

Maple sirup and sugar were made in the back country of the colonies, and nearly every farm had a collection of hives so that honey was available. Although sugar cane was grown to a limited extent in southern Georgia, almost all of the sugar used in the colonies was imported from Jamaica, Nevis, and the Barbados. In the years 1677-1678, as much as 190,436 pounds of sugar was imported from these countries into Virginia; 10,525 pounds into the Carolinas; 655,921 pounds into New England; and 30,550 pounds in New York.²⁰ All of this sugar was not consumed in the colonies. The development of intercolonial trade had been such that the continental colonies regularly exported their products to the West Indies and in return, received from the Indies sugar, tobacco, molasses, and so on, which the colonists in turn sent to Europe. Sugar came in 15-pound cones, wrapped in blue paper, having considerable end use for decorative purposes. In the household, sugar was kept securely locked in a sugar chest, which was, quite often, of intricate ornamental design. Sugar was cut from the cone by shears.

As a protest against tea taxation, a chocolate mill was built in Massachusetts in 1760.²¹ Coffee was also used as a substitute for tea. "Madam," asked John Adams of Mrs. Huston at Falmouth, "is it lawful for a weary traveler to refresh himself with a dish of tea, provided it has been honestly smuggled or paid no duty?" The answer was to the point. "No, sir, we have renounced all tea in this place, but I'll make you coffee."²² The Pennsylvania Dutch (settlers from The Palatinate of the Rhine Valley) made "coffee" of burnt rye or wheat, the forerunner of our coffee substitutes of today. A coffee substitute was also prepared from diced, roasted potatoes. Around 1772, attempts were made to raise tea in Georgia, and even as late as 1857 it was suggested that tea could be grown in the southern part of the United States in a broad band extending from the Atlantic to the Pacific Coast.²³

It was easier and more profitable to produce food in the southern colonies than in the northern. The mild climate and slave labor in the South made living more favorable. The rocky and wooded hillsides and unfavorable climate of the northern New England colonies did not permit widespread farming operations. The home life of the average New England rural family, although wholesome and practical, was arduous. Toil from sunup to sundown was the routine, and by nine o'clock at night no candles twinkled in the windows of the lonely farmhouses. The strong religious coloring attached to all life in New England gave work there a significant moral virtue, and idleness was considered a sin. Hard and honest toil complied with the will of God; success in one's work was a just reward from the Lord, the fruits of which were not to be wasted on the frivolous.

(Continued on page 358)



where the future begins

You are looking at a piece of our world—approximately 600,000 square miles of it photographed from a Martin Viking research rocket which attained an altitude of 158 miles.

This picture says more than words about the future of flight. But what about *your* future?

Today at Martin, one of the finest engineering teams in the world is at work on tomorrow's development and design problems in the fields of AERODYNAMICS, ELECTRONICS, STRUCTURES, PROPULSION AND NUCLEAR POWER.

No matter how limited or extensive your background, there will always be openings on that team for the engineer who has what it takes to go *higher!*

Contact J. M. Hollyday, Dept. T-5, The Glenn L. Martin Company, Baltimore 3, Maryland.

MARTIN

BALTIMORE • MARYLAND



FOOD

(Continued from page 356)

ties of life. A colonial farm supper was simple: the children ate milk porridge or hasty pudding, while father and mother had a slice of cold pork, brown bread, and a mug of beer. Brayley makes the following comments:

At the close of the 18th Century the poverty of the masses made simplicity of living a necessity, and any cooking requiring sugar was too expensive for them. The noonday meal dispatched in 15 minutes began with Indian pudding, relished with a little molasses. Next came a piece of boiled salt pork with cabbage, or black broth, fried eggs, brown bread, and cider. The dinner of "boiled victuals" was served in wooden trenches. The meat of the shagbark[§] was dried and pounded and then put in their porridge to thicken it. Barley firecake was served at breakfast. They parched corn and pounded it and made it into no-cake. The extra dish for company was a cake made of strawberries and parched corn. Baked beans, baked Indian pudding, and newly baked rye- and-Indian bread on Wednesdays and salt fish regularly on Saturday are historical dishes. Tobacco, which was early cultivated, was considered essential to health and comfort, and at one time every farmer had his tobacco yard as well as his cornfield.²⁴

Present-day nutritionists would undoubtedly gasp at this diet, but at that time there was not sufficient knowledge to appreciate the inadequacy of such a fare. The science of nutrition had to wait until the middle of the Nineteenth Century before light began to dawn on this important field. Spruce beer, made by boiling the bark and leaves of the spruce, was in common use and a generally accepted antiscorbutic during the Eighteenth Century.²⁵

It is apparent that our colonial forefathers had no conception of vitamins or balanced diets. Yet on a miserable fare of salt pork, corn, molasses, and rum, and plagued by hidden hunger, they carved a great country from the wilderness. It is true that they did not live as long as we do today. But it is equally true that they learned more, feared more, enjoyed more, and prayed more during their average life span of about 45 years than we do today in our span of some 60 years.

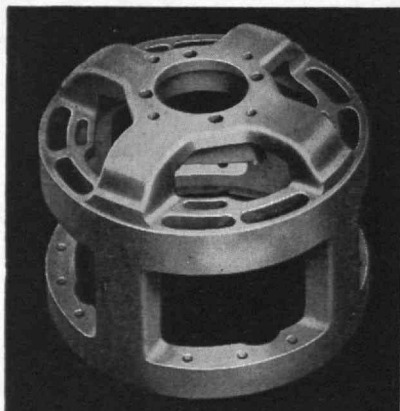
(Continued on page 360)

§ Apparently a hickory, *Carya ovata*.

CASTING FOR QUALITY?



The Most Complete
and Modern
Die-Casting Facilities
in New England



Our latest type high pressure Lester Phoenix machines insure precision low-cost castings.

You can depend upon our proven know-how to design and develop your most intricate castings.

Ask to have the Mason representative call, or send us your prints. Our Engineering department will give every request, whether large or small, conscientious prompt attention.

L. E. Mason is an approved source for America's leading manufacturers.

L. E. MASON CO.

BOSTON 36, MASS.

Established 1931

William H. Coburn & Co.

INVESTMENT COUNSEL

68 Devonshire Street

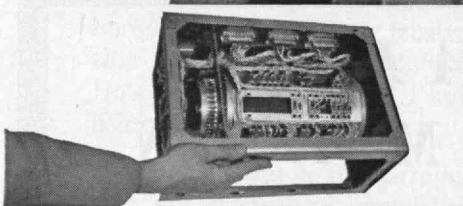
Boston

*Hughes, pioneer developer of
airborne digital computers, and
leader in radar fire control,
now enters the field
of ground radar and data
processing systems.*

Important new programs are under way in the Radar Research and Development Division for the development of ground radar and data processing networks. In these projects, Hughes engineers are drawing on their extensive experience in the successful development of radar fire control systems and airborne computers.

The data gathering for these ground networks will be performed by very high power radar using advanced high-speed scanning techniques developed by Hughes under sponsorship of the U. S. Navy. The processing, transmission, and correlation of the great mass of data involved will be handled by large-scale digital systems. This equipment must be designed to meet stringent tactical requirements for reliability and maintainability.

SCANNING A NEW HORIZON



Shown here is a new magnetic drum memory for the Hughes airborne digital computer. Many of the techniques it employs will be used in the ground radar data processing systems.

Here are some of the types of work included:

TRANSISTOR CIRCUITS
DIGITAL CIRCUITS
MAGNETIC DRUM AND
CORE MEMORIES
LOGICAL DESIGN
PROGRAMMING
ADVANCED RADAR TECHNIQUES

Engineers and Physicists

Application of the techniques, special knowledges and individual talents indicated here is creating positions at all levels in the Ground Systems Department. Engineers and physicists with experience in the fields listed, or those with exceptional ability in these directions, are invited to consider joining our Staff.

*Scientific
and
Engineering
Staff*

HUGHES

RESEARCH
AND DEVELOPMENT
LABORATORIES

Culver City, Los Angeles County,
California

FLETCHER **g** ranite

r stand **d**ized curb

a dimension m **s**onry

n broke **a**shlar

i bridge p **e**r facing

t bound pos **s**

e thin v **n**eers

Quick Delivery 187

H. E. FLETCHER COMPANY

WEST CHELMSFORD, MASSACHUSETTS

☎ LOWELL GLENVIEW 7-7588

114 EAST 40TH STREET, NEW YORK 16, N. Y.

FOOD

(Continued from page 358)

REFERENCES

1. Longfellow, Henry W., "The Courtship of Miles Standish," *Complete Poetical Works of Henry Wadsworth Longfellow* (Boston: Houghton Mifflin and Company, 1922).
2. Brayley, Arthur W., *Bakers and Baking in Massachusetts*, page 7 (Boston: Master Bakers' Association of Massachusetts, 1909).
3. Adams, J. A., *New England's Prospect*, 1933 (American Geographical Society of New York, Special Publication No. 16, 1933).
4. Wood, William, *New England's Prospect* (Boston: Prince Society Edition, 1865).
5. Longfellow, Henry W., "Song of Hiawatha," *Complete Poetical Works of Henry Wadsworth Longfellow*.
6. Josselyn, John, *New England's Rarities Discovered* (London: G. Widdowes, 1672).
7. Brayley, *op. cit.*, page 68.
8. Winthrop, John, Jr., "Description, Culture, and Use of Maize," *Philosophical Transactions, Royal Society of London*, XII:1065-1069, No. 142 (1678).
9. Blake, Nelson M., *A Short History of American Life* (New York: McGraw-Hill Book Company, 1952).
10. Brayley, *op. cit.*, page 35.
11. Shakespeare, William, *Merry Wives of Windsor*, Act V, Scene v, line 21 (Boston: Ginn and Company, 1936).
12. Walpole, N. H., *American Cookery*, page 63 (Printed for Elijah Brooks, 1812).
13. Bidwell, Percy W., and Falconer, John I., *A History of Agriculture in the Northern United States*, (Concluded on page 362)

A Report TO M.I.T. MEN

In 1917 Walker Memorial Building was opened, a gift from Alumni for the welfare of M.I.T. students. In addition to including offices for student activities and serving as a student social center, this building houses the dining service.

In 1953-54 nearly one million meals were served to staff and students and 57 dances, receptions and balls were held in Morss Hall. Morss Hall seats approximately 500 people. Thus, each chair served 2,000 people per year or 5.5 persons per day. We thank the Alumni for making these services possible.

WALKER MEMORIAL DINING SERVICE

• M.I.T. •

CAMBRIDGE 39, MASSACHUSETTS

R. J. RADOCCHIA, *Manager*

"The day
my son's future
began"



"Ken knocked around quite a bit after college. Tried several jobs and did well. But he was never really satisfied. He'd either get bored with the work or frustrated with routine advancement. I didn't worry though. He's bright, sensible, and I knew he'd establish himself soon enough.

"Then, about a month ago Ken breezed into my study and somewhat breathlessly announced that he'd decided to go into the life insurance business. Before I could even look surprised, he explained that he had always been interested in people and that this would give him an opportunity to work more closely with them. And his eyes brightened

when he pointed out how, as an agent, he'd be his own boss—running a business all his own.

"He went on at a mile-a-minute explaining how he'd be thoroughly trained by New York Life experts—with a good salary while learning. How he figured that once he was on his own he'd be able to give his future family the same kind of comfort and security he had always known at home. And he wound up telling me how, someday, he hoped to retire with a good income—just as I will soon myself.

"Then, quick as he came, Ken up and left without even asking what I thought. But of course he already knew. How could another New York Life agent possibly disagree?"

NEW YORK LIFE

INSURANCE COMPANY



The New York Life Agent in Your Community
is a Good Man to Be!

MAIL THIS COUPON TODAY!

New York Life Insurance Company, Dept. A-2
51 Madison Avenue, New York 10, N. Y.

Please send your new booklet, "A Good Man To Be," with full information about career opportunities with New York Life.

Name _____ Age _____

Address _____

City _____ Zone _____ State _____

Present Occupation _____

FOOD

(Concluded from page 360)

1620-1860, Publication No. 358 (Washington: Carnegie Institution of Washington, 1925).

14. Wyeth, Nathaniel J., United States Commissioner of Patents, *Annual Report, 1848*, Ex. Doc. 59, page 696.

15. May, Robert, *The Accomplish't Cook*, page 214 (London: Printed by R. Wood for N. Brooke, 1660).

16. *Report of Commissioner of Patents (Agriculture) for the Year 1857*, pages 133-152 (Washington, D.C.: 1858).

17. "Journal of William Black," *Pennsylvania Magazine of History and Biography*, I:117 (1877).

18. Prentice, Ezra P., *Hunger and History*, page 186 (New York: Harper and Brothers, 1939).

19. Maclay, Edgar S., *Journal of William Maclay*, page 137 (New York: Albert and Charles Boni, Inc., 1890).

20. Ellis, Ellen D., "An Introduction to the History of Sugar as a Commodity," Bryn Mawr College Monograph Series, 4:100-101 (Philadelphia: The John C. Winston Company, 1905).

21. Thomas, Gertrude I., *Foods of Our Forefathers*, page 181 (Philadelphia: F. A. Davis Company, 1941).

22. Charles A. and Mary R. Beard, *Rise of American Civilization*, page 266 (New York: The Macmillan Company, 1927).

23. *Report of Commissioner of Patents (Agriculture) for the year 1857*, pages 166-181 (Washington, D.C.: 1858).

24. Brayley, *op. cit.*, pages 123-124.

25. Appleton, V. B., "Spruce Beer as an Antiscorbutic," *Journal of Home Economics*, XIII:604-606 (1921).

CERRO BOLIVAR ORE

(Continued from page 342)

and a constant commuter was George S. Colley, Jr., President of Constructora Bechtel.

To all visitors, it was an unforgettable experience to stand on the slopes of Cerro Bolivar with some of the men in immediate charge of development and examine samples of ore—particularly on the eve of production. On November 27, power shovels on the hillside worked with special intensity. They were loading dump trucks in quick succession. The trucks rolled to a temporary platform alongside the track. Here were standing the first ore cars to have been put ashore at Puerto Ordaz only a few days before. They had since been hauled to Cerro Bolivar and were now receiving their initial consignment of ore. One of the most interested of spectators was Graham Lancaster, Vice-president and resident manager of Orinoco Mining Company.

A 60-car trainload was being made up for an experimental, inaugural run from Cerro Bolivar to Puerto Ordaz, with some 4,000 tons of ore. It was on a Sunday, when track work was at a minimum, that the ore train began its descent from the hill. The train was on the steepest grade on the entire line—three point one per cent. Three Diesel-electric locomotives of 1,600 horsepower apiece pulled the 60-car train. When mining operations were in full swing, there would be as many as 120 cars at a time.

(Continued on page 364)

PEARLITIC MALLEABLE CASTINGS

when operating conditions are severe

If service conditions are unusually rugged and you're troubled by high manufacturing costs—look to pearlitic malleable castings!

Pearlitic malleable has high fluidity that casts easily into complicated shapes. It resists wear under heavy loads at high speeds . . . has high ultimate strength . . . possesses excellent non-seizing properties for bearing surfaces . . . can be given a very smooth finish where desired . . . and can be either liquid quenched or air quenched. And perhaps most important of all, pearlitic malleable machinability index ranges from 80 to 90 (B1112 steel=100).

So look your product over critically. Then check pearlitic malleable castings. They can replace more expensive methods of fabrication or manufacture . . . can lead to reduced weight, less machining time . . . fewer assembly operations . . . greater sales appeal for your product.

AA-977

**NATIONAL
MALLEABLE AND STEEL
CASTINGS**



COMPANY
Cleveland 6, Ohio

The Nation's largest independent producer of
malleable and pearlitic malleable



*A fine selection
in Tropical weights . . .*

SUITS for MEN



The new fabrics, used in making your tropical weight suits for spring, summer and fall wear have many unusual and very desirable features. These suits keep their shape wonderfully well, resist the warm weather wrinkles and require a minimum of pressing. They are comfortable for wear in all but the coldest months. The Coop offers you a wide choice of fabric, color and style . . . all excellent quality.

Springweave	\$ 45.00
Mohara	\$ 47.50
Wonderon (Visa)	\$ 55.00
Tropical Worsteds	\$ 65.00

**3-MONTH PAYMENT PLAN AVAILABLE
PATRONAGE REFUND TOO**

Tech Men please note that membership in the Technology Store entitles them to the Patronage Refund on purchases made in the Harvard Square Store. Tech Graduates may join at either store.

The COOP
Harvard Square Store



WALKER MEMORIAL

Center of undergraduate life, named in memory of Francis Amasa Walker, 3d President of the Institute 1881-1897, "soldier, economist, teacher, administrator, a gentleman of rare courtesy, preserver of the autonomy of the M.I.T."

One of the eight designs by Samuel Chamberlain of the Class of 1918 for the series of M.I.T. dinner-service plates produced for the Alumni Association by Josiah Wedgwood and Sons, Ltd., of Barlaston, Staffordshire, England.

Orders in sets of eight should be placed with the Alumni Office, Room 1-280, M.I.T., Cambridge 39, Mass., for delivery prepaid in the U.S.A. or Canada at the following prices:

On Queen's Ware at \$24.50 (or \$12.25 per set and balance in sixty days)

Special limited edition of numbered sets on Bone China at \$85.00 (or \$42.50 per set and balance in sixty days)

CERRO BOLIVAR ORE

(Continued from page 362)

As the first ore train neared the end of the line, another milestone in the history of the Orinoco Project was passed. Soon the ore brought by that train would be crushed, stockpiled, and poured into ships which would carry it to blast furnaces in the United States.

Loaded cars from Cerro Bolivar were shunted to the base of a ramp, and from there they were fed into a massive steel frame. One after another, at a rate up to 67 per hour, their loads were dumped into a giant primary crusher. As soon as each car was emptied, its place was taken by another. Eighty tons or more at a time were dropped into the crusher.

Here began an extraordinary procession. Out of a tunnel from the primary crusher pit moved the ore on a five-foot-wide belt, and upward to a secondary crusher which reduced all chunks from a maximum of nine inches in diameter to five inches or less. The belt system, at a speed of 600 feet per minute, swept the ore aloft to the bridge—a huge movable structure mounted on rails, with a span of 400 feet. The ore cascaded onto a storage pile that could grow to 700,000 tons.

Under concrete slabs at the base of the pile were two parallel tunnels in each of which were two traveling plow feeders. Huge, bladed arms, rotating horizontally, scraped the ore from a shelf onto a

collecting belt. A river of ore flowed toward its destination. It passed through a plant which automatically weighed and sampled it. Thence it was shifted to a transfer house, where the belts changed direction and ran it out along the dock.

In the transfer house, an operator at a central panel could control every phase of the entire operation, with constant two-way communication all the way from the car dumper to the dockside.

By means of a loader moving on rails along the dock from one hold to another, ore could be fed into ships at a rate up to 6,000 tons per hour. This might one day be increased, with the installation of additional equipment, to as much as 12,000 tons.

January 9, 1954, was a gala day for the people of Puerto Ordaz—a day that began at the local airport, when reporters, photographers, and distinguished visitors from Caracas arrived in special airplanes. Most distinguished of all the visitors was Colonel Marcos Pérez Jiménez, President of Venezuela, who came to inaugurate the operations of Orinoco Mining Company and to dispatch the first cargo of ore.

The President, his party, and all the guests drove in official and private cars from the airport to the dock. A decorated and canopied flatcar served as a speakers' platform, and a crowd of Venezuelans and North Americans gathered expectantly before it. The Bishop of Guayana bestowed his blessing and Francis Thomas spoke on behalf of Orinoco Mining Company. Then Pérez Jiménez spoke:

(Concluded on page 366)

Creative Engineering FOR FLIGHT SAFETY...



Opens Golden Opportunities at **STANLEY AVIATION**

- AERONAUTICAL ENGINEERS
- ELECTRICAL ENGINEERS
- MECHANICAL ENGINEERS

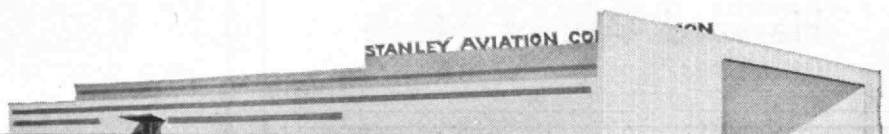
Your future is here . . . today!

From the developers of the famous push button pilot ejection seat comes this latest creative engineering accomplishment . . . the Stanley Procedure Trainer pictured.

If your eyes are on the future and your feet on the ground . . . this is your golden opportunity to grow with one of America's fastest growing young aviation research and development companies.

LOCATE BUFFALO, N. Y. OR DENVER, COLO.

Contact Personnel Director, Stanley Aviation Corp., Buffalo 25, N. Y. or Denver 8, Colo.



What is Your taxable estate?

Your taxable estate may be much larger than you think — after you've added together the value of all its parts.

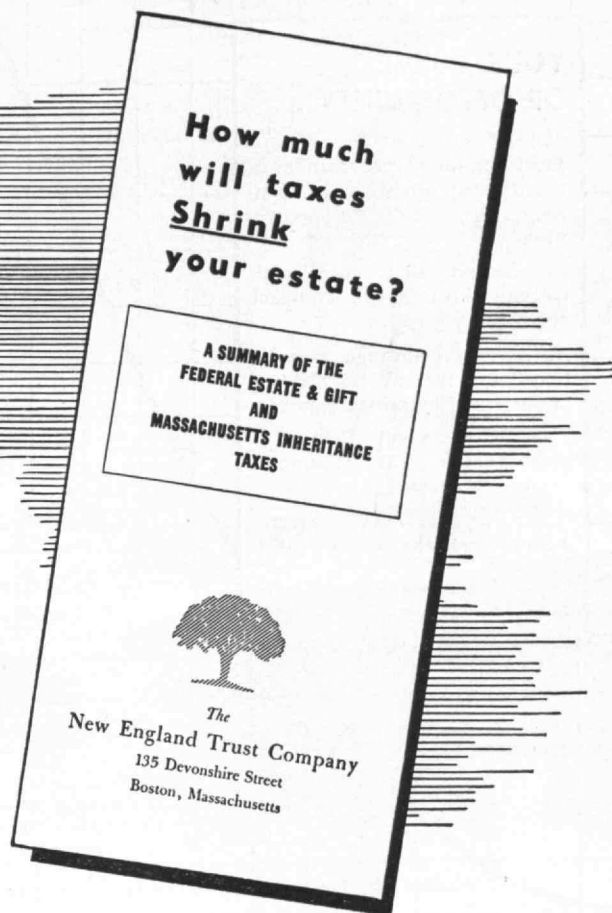
Your taxable estate will probably include property you own jointly, and the face value of your life insurance. These will be added to all the property that will pass under your will.

It's important to know the size of your gross taxable estate. That will give you an idea of the tax your estate will have to pay. Then, through a revision of your present estate plan, you may be able to cut the tax now indicated. It may even be possible to eliminate the tax entirely.

If you're married, you want to be sure that you take full advantage of the estate tax marital deduction.

Whether you're married or not, you can take steps now to eliminate "double" estate taxation.

You can make your own estimate of your



taxable estate by using our folder, "How Much Will Taxes Shrink Your Estate?" Some possibility of tax saving might well be indicated. We'll be glad of the opportunity to consult with you and your lawyer about new arrangements for your property that might reduce your taxable estate.

Visit our Trust Department, second floor, 135 Devonshire Street, and ask for "How Much Will Taxes Shrink Your Estate?" Mr. Eddy, or one of his associates, will gladly give you a copy.

The New England Trust Company

Incorporated 1869

135 DEVONSHIRE STREET

Back Bay Branch: 99 Newbury St., Boston, Mass.

Member of the Federal Deposit Insurance Corporation



YOUR CURVE OF OPPORTUNITY . . .

Doelcam, the newest member of the Minneapolis-Honeywell family, offers you a double opportunity.

Recognition that goes with working in a small, compact engineering group.

Advancement through association with the world's largest producers of automatic controls.

Prominent among Doelcam personnel are 17 M.I.T. alumni.

Doelcam

A DIVISION OF MINNEAPOLIS-HONEYWELL
SOLDIERS FIELD ROAD - BOSTON 35, MASS.



Instruments for Measurement and Control
Synchros • Gyros • Servos • Microsyns • Servo Motors

N. E. Andres '48
S. D. Blitzer '46
R. B. Bross '39
N. O. Clark '27
J. E. Egbert '44
J. R. Gray '40
T. K. Maples '43
H. D. Marcus '48
K. C. Mathews '46
J. A. Maynard '46
W. A. Rote '42
J. T. Ryan '51
P. B. Samuelson '32
G. J. Schwartz '42
J. A. Vitka '49
M. P. White '31
J. J. Wilson '29

Write C. F. TAYLOR, Personnel Mgr.

CERRO BOLIVAR ORE

(Concluded from page 364)

"The first shipment of iron ore from Cerro Bolivar leaving this port is of great importance to Venezuela," said the President, "as it marks the beginning of the technical development of this valuable wealth on a large scale . . ."

The President pressed a button that caused the ore-handling machinery to go into action for the pouring of the last few tons to complete the loading of the first ship to carry Cerro Bolivar iron ore from Puerto Ordaz. It was a ship called the *Tosca* that had the honor. She was bound for the East Coast of the United States with 6,000 tons.

Ten days later, and 2,000 miles from Puerto Ordaz, a proud ship steamed up the Delaware River. Her immediate goal was Philadelphia. As she approached the historic city she was escorted by a flotilla of tugs and fireboats. A delegation boarded the *Tosca* to bid welcome to her and her captain. The hatches were open to display the cargo. In the group were the mayor and the Venezuelan Ambassador, the American Ambassador to Venezuela, the chairman of the Port Authority, and Clifford Hood, President of U. S. Steel. Gifts were exchanged, including a silver box of Cerro Bolivar ore which Captain Svante Hedin presented to the City of Philadelphia.

On went the *Tosca* 30 miles farther upstream to complete her voyage. She tied up to a dock near Morrisville, Pa., the home of the new Fairless Works, where iron ore from far places was being smelted and processed. On the morning of January 20, the dock was closed in by mist which lent an aura of drama to the scene as diplomats, officials of United States Steel, reporters, and photographers gathered to witness the unloading of the first iron ore from Cerro Bolivar. It was Benjamin Fairless who gave the word to the operator of the boat unloader:

"Frank Rossi, are you ready?"

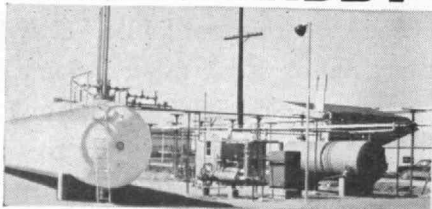
"Yes, Sir, Mr. Fairless."

"Proceed."

"Here it comes."

This ceremonial sample of ore spilling into a box was the first fruit of years of exploration, of planning, and of labor. But not on the part of U. S. Steel alone. It was the result of a co-operative effort in which the people and the Government of Venezuela joined; and it exemplified what real and enlightened international co-operation could do to advance the welfare of mankind.

Gas STANDBY



Packaged 12 mcfh plant designed and built by Draketown for . . .

- ★ Utility or Industrial standby
- ★ Peak shaving and augmentation
- ★ 100% Town or plant supply

A Packaged Draketown Propane Plant will help you reduce demand charges; provide a supply of gas during curtailment periods . . . at the turn of a valve . . . or supply that outlying section or plant 100% if desired.

DRAKETOWN®

PROPANE PLANTS

"Good Gas Insurance"

If you have a gas problem, we can help you. We operate from coast to coast and overseas.

Phone or write today—no obligation.

DRAKE & TOWNSEND

INCORPORATED

Consulting • Design • Engineering • Construction

11 WEST 42ND STREET • NEW YORK 36, N. Y.

J. C. CORRIGAN CO., INC.

Conveyors

ENGINEERS—MANUFACTURERS—ERECTORS

Portable Conveyors

Conveying Systems and Material Handling Equipment
Coal Handling Systems

Executive Offices
& Plant: 41 Norwood St.
Boston 22, Massachusetts
Tel.: GENEVA 6-0800

Branch Sales Office:
420 Lexington Avenue
New York 17, New York
Tel.: LEXINGTON 2-9144



"Well, what did you expect? That H & D corrugated box he's wearing gives him complete protection!"



Your product's a winner, too,
in an H & D box. See . . .

HINDE & DAUCH

12 FACTORIES AND 40 SALES OFFICES IN THE EAST, MIDWEST AND SOUTH

If You Need Additional Manufacturing Capacity

CALL IN

LIQUID's

CONTRACT MANUFACTURING DIVISION

◆ Capacity and manpower available on Machine Shop, Sheet Metal and Woodworking facilities for industrial or defense contracts.

Write for illustrated booklet "Special Contract Department" which lists and describes facilities.



Contract Manufacturing Division

THE LIQUID CARBONIC CORPORATION
3100 South Kedzie Ave. • Chicago 23, Illinois

Manufacturers of Brewing and Bottling Machinery, Soda Fountains,
Gas Welding Equipment, CO₂ Gas, Dry Ice, Oxygen and Medical Gases



AT YOUR SERVICE



SPECIALIZED ENGINEERING
SPECIALIZED EXPERIENCE
SPECIALIZED MACHINERY

FOR

TWISTING • BUNCHING
STRANDING • FORMING

AND LAYING IN THE

TEXTILE • WIRE • CORDAGE

AND MANY OTHER INDUSTRIES

WRITE TODAY, YOUR INQUIRY WILL GET PROMPT ATTENTION

HASKELL-DAWES

MACHINE CO., INC.
2131 E. ONTARIO STREET
PHILADELPHIA 34, PA.

Serving Industry and Commerce

TECHNOLOGY—The science or systematic knowledge of the industrial arts.—*Webster's Unabridged*

Just as *industrial production* is an art that has been greatly advanced by the science of technology, so the *commercial arts* of manufacturing, transportation and distribution have been aided to greater progress by the banking system of America.

Like Massachusetts Institute of Technology, the Second Bank-State Street Trust Company is a New England institution. To undergraduates or alumni either planning their first banking connections or seeking additional services, it offers a complete and well rounded banking and trust service.

SECOND BANK-STATE STREET TRUST COMPANY

Boston • Massachusetts

111 FRANKLIN STREET

State Street Office: STATE and CONGRESS STS.

Union Trust Office: 24 FEDERAL ST.

Statler Office: ARLINGTON and PROVIDENCE STS.

Copley Square Office: 587 BOYLSTON ST.

Mass. Ave. Office: MASS AVE. and BOYLSTON ST.

Member Federal Deposit Insurance Corporation

MELPAR A COMPLETE FACILITY

has unusual advantages to offer
qualified engineers

RESEARCH • DEVELOPMENT • DESIGN • PRODUCTION

- Measuring Techniques and Fundamental Investigations of the Behavior of Mechanical Systems.
- Radioactive Tracer Techniques.
- Instrumentation and Control Devices (servo, pneumatic and electric control).
- Network Theory
- Data Handling Equipment (magnetic cores, magnetic recording equipment, digital computing techniques, analogue to digital conversion shaft digitizers).
- Flight Simulation (servo-mechanisms, pulse circuitry, electronic cabling).
- High Frequency Antennas.
- Audio and Video Circuit Designs.
- Small Mechanisms Design.
- Mechanical Packaging of Electronic Components.
- Design of Reciprocating Compressors, Hot Gas Generators and Diesel Engines.

Please send inquiries for additional
information to

DEPT. T.P.101

MELPAR, INC.

452 SWANN AVENUE

ALEXANDRIA, VIRGINIA



452 SWANN AVENUE • ALEXANDRIA, VIRGINIA
11 Galen Street • Watertown, Mass.

A SUBSIDIARY OF THE
WESTINGHOUSE AIR BRAKE COMPANY

GENIUS OF SAMUEL SLATER

(Continued from page 338)

authority. During a visit to New England in the year 1833, President Andrew Jackson was shown, in Pawtucket, a form of prosperity with which he had not been acquainted. To him, a Southerner, prosperity meant fertile fields of tobacco, rice, wheat, flax, indigo, rye, and, of course, cotton. This village of Pawtucket was prosperous because of its busy Slater Mill, which paid wages that enabled citizens of the village to live in warm houses, wear good clothing, and have plenty to eat—the measures of a comfortable standard of living for any community. The president was so impressed that he wished to see the man who was responsible for this pleasing situation, and when he learned that Samuel Slater was confined to his home with rheumatism, he and his Vice-president and members of his cabinet paid Slater a visit. Certain of the traits whereby Slater had achieved industrial success were similar to those that had made Jackson a successful President of the United States. The two elderly men thus had much in common, and they had a pleasant visit. At the end, the President said:

"I understand you have taught us how to spin, so as to rival Great Britain in her manufacture; you have set all these spindles to work, which I have been delighted in viewing, and have made so many happy by a lucrative employment."

"Yes Sir," said Slater, "I suppose that I gave out the psalm, and they have been singing to the tune ever since."

President Jackson could think of but one title for a man with Slater's amazing record—he greeted Samuel Slater as the "Father of American Manufacture," and the pleasant visit came to an end.

Epilogue

When Samuel Slater died, the three sons, whom he had taught his methods of textile manufacture, ably demonstrated their talent as they managed the great Slater estate bequeathed them. At the time, son George was 31, John was 30, and Horatio Nelson was 27. George and John died within a decade of their father's death, and it was left to young Horatio Nelson to carry on, in a manner that would have delighted his father. For Horatio Nelson continued to expand the Slater activities, keeping them to the forefront of the rapidly growing textile industry of America.

(Concluded on page 370)

Hotel COMMANDER CAMBRIDGE, MASS.

By the Common facing Harvard
and Radcliffe Colleges

315 rooms of which 120 are transient single rooms and suites and the remainder consist of 1, 2, 3, and 4 room completely furnished house-keeping units. Open air Sun Deck.



Colonial Dining Room

Cocktail Lounge

9 Function Rooms accommodating up to 650 persons
Ten minutes by bus from M.I.T. AAA recommended

Headquarters for Rotary, Kiwanis, Exchange and Quota Clubs.



**"Precision-Gauged"
HAIRSPRINGS**

Manufacturer of all types of
hairsprings, with more than 20
years experience making Beryl-
lium Copper Hairsprings for
critical instrument applications.

PRECISION PRODUCTS COMPANY INC OF WALTHAM
WALTHAM 54 • • MASSACHUSETTS

SCULLY SIGNAL COMPANY

Safe Fills } with
No Spills } VENTALARM®
WHISTLING TANK FILL SIGNAL

for automotive, home
and diesel fuel tanks

F. P. Scully '15

174 Green Street, Melrose 76, Mass.



"JUST FILL

'TIL THE WHISTLE STOPS"

Lord Electric Company

INCORPORATED

FOUNDED BY F. W. LORD, M.I.T. '93

1895

ELECTRICAL CONSTRUCTION

1955

131 Clarendon Street
Boston 16, Massachusetts
Telephone COmmonwealth 6-0456

10 Rockefeller Plaza
New York 20, N. Y.
Telephone CIrcle 6-8000

140 Stanwix Street
Pittsburgh 22, Pa.
Telephone COurt 1-1919

GANNETT FLEMING CORDDRY AND CARPENTER, INC.

Engineers

HARRISBURG, PA.

Branch Offices:

Pittsburgh, Pa.

Daytona Beach, Fla.

Philadelphia, Pa.

Expressways, Toll Roads, Bridges and Airports. Traffic & Parking. Dams, Water Works, Sewage, Industrial Wastes
and Garbage Disposal. Appraisals, Investigations and Reports.

The TREDENNICK-BILLINGS CO.

Construction Managers

Building Construction

K. W. RICHARDS '07

H. D. BILLINGS '10

C. C. JONES '12

F. J. CONTI '34

10 HIGH STREET

BOSTON, MASSACHUSETTS



HOLMES & NARVER, INC.

ENGINEERS • CONSTRUCTORS

JAMES T. HOLMES
M.I.T. '14

D. LEE NARVER
STANFORD '14

828 S. Figueroa St., Los Angeles 17, California

Telephone TRINITY 8201

SYSKA & HENNESSY, INC.

Engineers



DESIGN • CONSULTATION • REPORTS

POWER PLANT • WASTE DISPOSAL • WATER SYSTEMS

New York City

CHAUNCY HALL SCHOOL

Founded 1828. The School that specializes in the preparation of students for the Massachusetts Institute of Technology.

Ray D. Farnsworth, *Principal* 533 Boylston Street, Boston, Mass.

LEONARD CONSTRUCTION COMPANY

Engineers and Contractors

SINCE 1905

IN THE AMERICAS AND FAR EAST

37 South Wabash Ave.

Chicago

N. A. LOUGEE & COMPANY

ENGINEERS AND CONSULTANTS

Reports—Appraisals—Depreciation Studies
Rate Cases—Business and Economic Studies

120 BROADWAY NEW YORK 5, N.Y.

N. A. LOUGEE '11 L. A. MATTHEWS '13
J. W. McDONALD, Jr. '20 B. F. THOMAS, Jr. '13
E. S. WEST '40

GENIUS OF SAMUEL SLATER

(Concluded from page 368)

He had rounded out the combined activity of father and son to nearly a full century at the time of his death. Two years later, the great Cotton Centennial of the year 1890 was held in commemoration of the start by his father of America's first successful cotton mill in tiny Carpenter's Clothier's Shop in Pawtucket.

Today, father and son would join in their respect for later generations of Slaters, who have carried on in the fine tradition of their progenitor, Samuel Slater.

REFERENCES

1. *The Architectural Review*, London, April, 1950.
2. Ashton, Thomas S., *The Industrial Revolution, 1760-1830* (New York: Oxford University Press, 1948).
3. Baines, Sir Edward, *History of the Cotton Manufacture in Great Britain* (London: H. Fisher, R. Fisher, P. Jackson, 1835).
4. Cheyney, Edward P., *An Introduction to the Industrial and Social History of England* (New York: The Macmillan Company, 1911).
5. *The Cotton Centennial—1790-1890*.
6. Glover, Stephen, *The History and Gazetteer of the County of Derby* (Derby: H. Mozley and Sons, 1833).
7. Guest, Richard, *A Compendious History of the Cotton Manufacture* (Manchester: J. Pratt, 1823).
8. Heaton, Herbert, *The Industrial Immigrant in the United States, 1783-1812* (American Philosophical Society, October, 1951).
9. Ware, Caroline F., *Early New England Cotton Manufacture* (Boston: Houghton Mifflin Company, 1931).
10. White, George S., *Memoir of Samuel Slater* (Philadelphia, 1836).

A. J. WOLFE CO.

Electrical Construction

2 HARRIS AVE.

JAMAICA PLAIN 30, MASS.

G. M. Wolfe
M. I. T. '40

E. H. Wolfe
Tufts '49

BLANCHARD CONSTRUCTION CO.

General Contractors

2546 S.W. Vista Ave.

Portland 1, Oregon

M. A. Blanchard '36

PROFESSIONAL CARDS

JACKSON & MORELAND *Engineers and Consultants*

DESIGN AND SUPERVISION OF CONSTRUCTION
REPORTS—EXAMINATIONS—APPRAISALS
MACHINE DESIGN—TECHNICAL PUBLICATIONS

BOSTON

NEW YORK

LESSELLS AND ASSOCIATES, INC. *Research—Development—Testing—Consultation*

Mechanical Engineering—Mathematical Physics
Electronics

Write for Brochure

916 Commonwealth Avenue Boston 15, Mass.

BEacon 2-2380

P. E. Kyle '39 T. A. Hewson '45 C. H. Kano '43
R. F. Brodrick '48 A. A. Kheiralla '47

EADIE, FREUND AND CAMPBELL

CONSULTING ENGINEERS

500 FIFTH AVENUE

NEW YORK 36, N. Y.

Mechanical—Electrical—Sanitary

Air Conditioning—Power—Process Layouts

J. K. Campbell, M.I.T. '11

GIVEN BREWER

Consulting Engineer

Electric Strain Gage Analysis • Stress Analysis

MARION, MASS.

TEL. 103, 110

G. A. Brewer '38

THE KULJIAN CORPORATION *Consultants • Engineers • Constructors*

UTILITY • INDUSTRIAL • CHEMICAL

Power Plants (Steam, Hydro, Diesel), Textile Plants,
Water & Sewage Works, Oil Refineries, Pipe Lines,
Army & Navy Installations, Air Fields, Hangars

H. A. Kuljian '19 A. H. Kuljian '48

1200 NO. BROAD ST., PHILADELPHIA 21, PA.

FABRIC RESEARCH LABORATORIES

Incorporated

*Research, Development and Consultation
for Textile and Allied Industries*

665 Boylston Street

Boston, Mass.

W. J. HAMBURGER, '21 K. R. Fox, '40 E. R. KASWELL, '39

GILBERT ASSOCIATES, INC.

ENGINEERS • CONSULTANTS • CONSTRUCTORS

607 WASHINGTON ST.
READING, PA.

Malcolm G. Davis '25, Vice President Allen W. Reid '12, E. C. Edgar '35
Steam, Hydro, Diesel Power Plants; Industrial Structures;
Plant Safety, Labor Relations, Utility Rates, Valuations,
Reports; Large Scale Purchasing; Industrial Laboratory
New York • Philadelphia • Washington

FAY, SPOFFORD & THORNDIKE

Engineers

John Ayer, '05 Ralph W. Horne, '10
Bion A. Bowman, '09 William L. Hyland, '22
Carroll A. Farwell, '06 Frank L. Lincoln, U. of Me., '25
Howard J. Williams, '20

AIRPORTS—BRIDGES—TURNPIKES
WATER SUPPLY, DRAINAGE AND SEWERAGE
PORT AND TERMINAL WORKS

BOSTON

NEW YORK

CLEVERDON, VARNEY & PIKE

Consulting Engineers

HERBERT S. CLEVERDON '10 WALDO F. PIKE '15

Structural Designs Foundations

Heating Ventilating and Plumbing Designs

Industrial Buildings, Reports, Investigations

120 TREMONT STREET BOSTON 8, MASS.

MAURICE A. REIDY

Consulting Engineer

BRIDGES

BUILDINGS

STRUCTURAL DESIGNS

FOUNDATIONS

CONSTRUCTION CONSULTANT AND ARCHITECTURAL ENGINEER

Estimates and Appraisals

101 TREMONT STREET BOSTON, MASS.

CHARLES NELSON DEBES AND ASSOCIATES

ENGINEERS AND CONSULTANTS

Architectural—Mechanical—Electrical—Structural
Management—Plant Layout—Material Handling
Acoustical

ROCKFORD TRUST BLDG. ROCKFORD, ILL.

C. L. EMERY '32 C. N. DEBES '35 R. S. KNOWLAND '40

MORAN, PROCTOR, MUESER & RUTLEDGE

CONSULTING ENGINEERS

Foundations for Buildings, Bridges and Dams;
Tunnels, Bulkheads, Marine Structures, Soil Studies and
Tests; Reports, Design and Supervision

WILLIAM H. MUESER '22 PHILIP C. RUTLEDGE '33

CHARLES A. MAGUIRE & ASSOCIATES

ENGINEERS

PROVIDENCE

BOSTON

CAPITOL ENGINEERING CORPORATION

CONSULTING ENGINEERS

Design and Surveys
Roads and Streets

Sewer Systems Water Works

Planning Airports

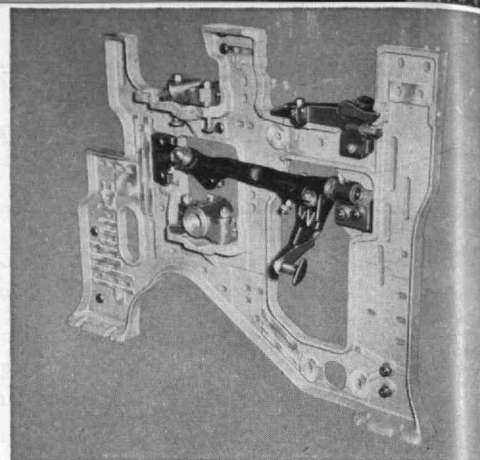
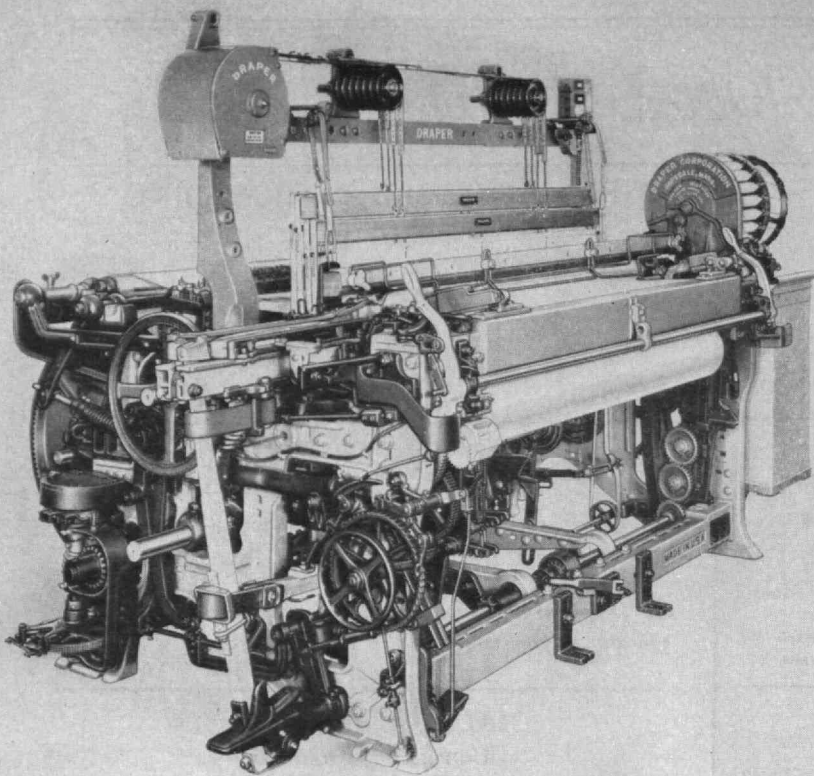
Bridges • Turnpikes • Dams

Executive Offices

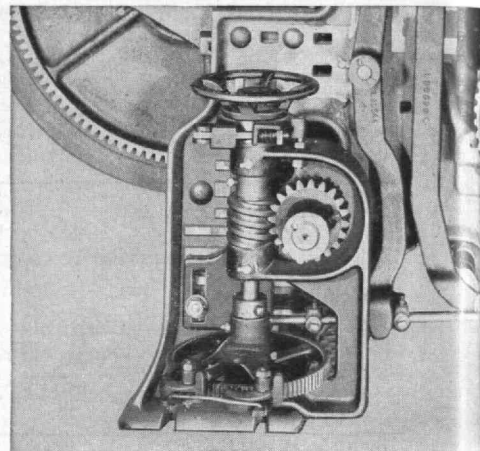
DILLSBURG, PENNSYLVANIA

Dallas, Texas Rochester, N. Y.

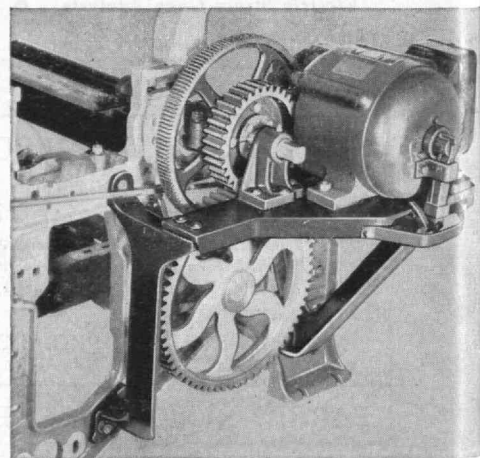
Robert E. Smith '41, Vice President



MORE MILLED and broached surfaces ensure better fit . . . less wear on component parts.



SIMPLIFIED DESIGN, precision gearing, and practical use of anti-friction bearings permit more accurate let-off adjustments.



THE DRAPER-DIEHL Power Transmitter . . . a compact power unit providing greater weaving efficiency with less maintenance.

THE DRAPER X-2 IS THE WORLD'S FINEST SINGLE SHUTTLE LOOM

Here's why:

Precision manufacture, rigid construction, and uniform parts permit operation of the Draper X-2 Model Loom at speeds far greater than heretofore possible.

Added efficiency and increased production are direct results of fewer mechanical stops, and the practical application of finer warp and filling controls.

The value of Draper X-2 Looms is clearly indicated by the increasing demand for this model . . . and the *more than 80,000 already in use.*



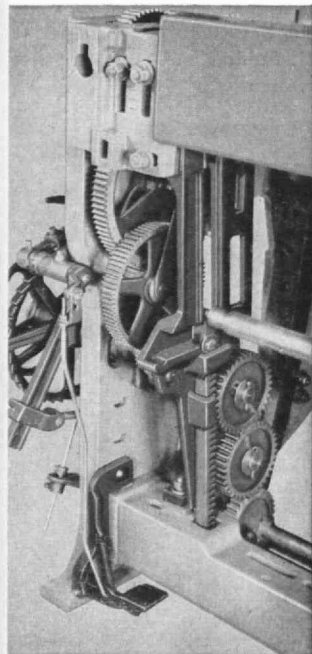
DRAPER CORPORATION

ATLANTA, GA.

GREENSBORO, N. C.

HOPEDALE, MASS.

SPARTANBURG, S. C.



RATCHET TAKE-UP permits more accurate yarn control . . . makes it easy to match the pick

Alumni AND Officers IN THE News

In The News:

AUDREY A. POTTER'03, Dean Emeritus of Purdue University — chosen to receive the annual award for outstanding service from the National Society of Professional Engineers, Philadelphia, Pa., in June.

HAROLD T. BENT'14 — elected vice-president and works manager of the Newport News Shipbuilding and Dry Dock Company.

JOHN O. MERRILL'19 — appointed to supervise the Architect-engineer (Skidmore, Owings, and Merrill) activities in connection with the construction and design of the United States Air Force Academy, which is to be located in Colorado Springs, Colo.

FRED W. MARLOW'21 — appointed president of the Los Angeles Realty Board for 1955.

DONALD R. TABER'25 — elected a director of the Hadley Falls (Holyoke, Mass.) Trust Company. Mr. Taber is treasurer and general manager of the American Pad and Paper Company, and is a vice-president of the Peoples Savings Bank.

C. STARK DRAPER'26, M.I.T. Professor of Aeronautical Engineering; in charge of the Department — invited by the Royal Aeronautical Society (England) to deliver the 43rd Wilbur Wright Memorial Lecture in London on May 19.

Vice-Admiral ALFRED M. PRIDE'26 — chosen "Man of the Week" by the Philadelphia *Inquirer*. Admiral Pride is one of the few flag officers who have come from the enlisted ranks to be in command of the American fleet guarding Formosan waters today.

ARTHUR G. CONNOLLY'27 — elected to the Board of Directors of the Sprague Electric Company.

WALTER W. SOROKA'30, Professor of Mechanical Engineering at the Engineering School of Design, University of California — honored with an invitation from the National Academy of the Lincei of Rome, Italy, to address an international

engineering gathering of distinguished scientists on "Analogical Models in Applied Mechanics," in Venice, Italy, next September.

GEORGE REID JORDAN'34 — appointed construction engineer and housing advisor to Trinidad by the Foreign Operations Administration.

WILLIAM R. WEEMS'35, Director, M.I.T. Industrial Liaison Office — on leave of absence to Korea on a project to develop the technical educational system for the South Korean government.

SEMON E. KNUDSEN'36 — named general manager of the Detroit Diesel Division of General Motors.

H. ERICH NIETSCH'38 — elected vice-president of project development by Robinson Aviation Inc., Teterboro, N.J.

W. KENNETH DAVIS'40 — promoted to director of reactor development for the Atomic Energy Commission. Mr. Davis will have charge of A.E.C. work on atomic engines for airplanes and naval vessels and on nuclear electric power.

CHARLES E. WAMPLER'40 — elected to the Board of Directors of Cutler-Hammer, Inc.

WILLIAM H. VOGT, III,'52 — elected associate editor of the Harvard Law School *Record* and president of the Bull and Bear Club.

JACOB P. DEN HARTOG, M.I.T. Professor of Mechanical Engineering; in charge of the Department — on leave of absence on a Fulbright Lectureship to give a series of lectures in mechanical engineering at Tokyo University, Japan, until July, 1955. In his absence, JAMES HOLT, Professor of Mechanical Engineering, will serve as acting head of the Department.

ROLAND D. PARKS, Associate Professor of Mineral Industry, M.I.T. — on leave of absence for a one-year appointment with the Technical Aid Program in India, serving as guest professor of metal mining and surveying at the Indian School of Mines and Applied Geology, Dhanbad.

By-lined by:

VANNEVAR BUSH'16, President of the Carnegie Institution, Washington, D.C., an article "To Make Our Security System Secure," *The New York Times Magazine*, March 20, 1955.

DAVID J. ABRAHAMS'22, an article "The Eternal Fireplace," *Journal of The American Institute of Architects*, February, 1955.

HARRIS A. THOMPSON'33, Associate Professor of Electrical Engineering, University of Colorado, a book entitled *Alternating Current and Transient Circuit Analysis* (New York: McGraw-Hill Book Company, Inc., 1955, \$6.75).

RICHARD MUTHER'38, management engineer, The Vendo Company, Kansas City, Mo., and a national director of the Society for the Advancement of Management, a book entitled *Practical Plant Layout* (New York: McGraw-Hill Book Company, Inc., 1955, \$12.00).

RAYMOND A. BAUER, research associate, M.I.T. Center for International Studies, a book entitled *Nine Soviet Portraits*. The book was published on April 15 (Cambridge, Mass.: Technology Press, M.I.T.; New York: John Wiley and Sons, Inc.).

THEODORE F. HEUTER, research associate in the M.I.T. Department of Physics and RICHARD H. BOLT, Professor of Acoustics and Director of the Acoustics Laboratory, a book entitled *Sonics* (New York: John Wiley and Sons, Inc., 1954, \$10.00).

M. STANLEY LIVINGSTON, M.I.T. Professor of Physics, a book entitled *High-Energy Accelerators* (New York: Interscience Publishers, Inc., 1954, \$3.25).

MATTHEW L. SANDS, Assistant Professor of Physics, M.I.T., a book entitled *Electronics: Experimental Techniques* (New York: McGraw-Hill Book Company, Inc., 1955, \$5.50).

JOHN C. SLATER, Harry B. Higgins Professor of the Solid State, M.I.T., a book entitled *Quantum Theory of Matter* (New York: McGraw-Hill Book Company, Inc., 1955, \$7.50).

Obituary

GEORGE F. SEVER'87, Date unknown.
ARTHUR B. STEARNS'90, December 14, 1954.*
DWIGHT P. ROBINSON'92, March 17.
DUDLEY C. CHAFFEE'94, Date unknown.
JOHN W. AMES'95, December 17, 1954.
CHARLES EWING'97, December 23, 1954.*
FRANK B. PERRY'98, February 25.
EDWARD B. RICHARDSON'98, March 5.
ARTHUR L. HAMILTON'99, March 20.

JAMES F. MONAGHAN'01, September 17, 1953.
FRANCIS B. GALAHER'02, March 18.
PHILIP C. PEARSON'02, January 27.
ALLAN S. COURTNEY'04, March 11.
WALTER L. WHITTEMORE'05, March 20.
PARK V. PERKINS'06, February 18.
LEWIS A. RILEY'06, Date unknown.*
BEN HERSHEY'08, February 22.
EUGENE A. COUPAL'11, February 19.
FREDERICK W. DODSON, JR., '17, February 19.*

HENRY E. RICHARDS'18, March 3.*
EVERT W. FREEMAN'20, March 9.*
MAURICE DE LA SALLE KEARNEY'21, Date unknown.
ERNEST F. STOCKWELL'22, March 9.
ADELBERT P. GODBOUT'23, March 2.
CARL H. BUSHNELL'29, February 1.
HYMAN STEIN'30, February 23, 1954.
FRANK POOLE'34, February 28.
PHYLLIS M. NOBLE'36, March 2.
CASPER J. STACEY'39, January 6, 1954.
*Mentioned in Class Notes.

News FROM THE Clubs AND Classes

CLUB NOTES

Berkshire County, Mass.

After two years of dormancy, the M.I.T. Club of Berkshire County met at a social hour in the Stanley Club of Pittsfield, Mass., on February 17. Old acquaintances were renewed and a number of new members were welcomed to this area by over 35 Alumni. After the social hour, dinner was served following which the Club was treated to a most enjoyable illustrated talk on underwater photography by Harold E. Edgerton'27, M.I.T. Professor of Electrical Engineering. Alumni Secretary Don Severance attended the meeting and brought us up to date on recent activities and changes at the Institute and in the Alumni Association.

Club President Harry Kalker'23 arranged for the meeting aided by Stanley Howard'35, William Rudge'27, and Lynn Wetherill'25. We are appreciative of the arrangements made by our General Electric Company members for the use of the fine Stanley Club for this meeting. Several meetings are planned during the year and we look forward with confidence to a vigorous club in Berkshire County. It is planned that discussions at future meetings will be on topics of general interest to all members and that well known members of the Alumni will be invited to make these presentations. All Berkshire County Alumni are invited to communicate with the undersigned regarding future activities of the organization. — HARRY KALKER'23, *President*, Sprague Products Corporation, North Adams, Mass.

Boston Luncheon

Thirty-nine members were present at our February meeting to hear Bernard E. Proctor'23, Professor of Food Technology and the Head of the Department, talk on "Food Futures." Although food safety is no longer a real issue in this country, it was not so very many years ago that important problems of preservation were solved. Dr. Prescott deserves much of the credit for research in improved canning methods around 1890. For example, his work on the canning of corn at about that time corrected the faults which had caused approximately one half of the cans to spoil and explode. In more recent years, much of the research has been devoted to increasing the convenience of foods, (precooked frozen foods, orange juice, and cake mixes, are illustrations), and their taste, appearance and nutritional values. — VINCENT T. ESTABROOK'36, *Secretary*, B. Standish Ayer and McKay, Inc., 50 Congress Street, Boston 9, Mass.

Buffalo

Eighty-five members of the M.I.T. club of Buffalo and their guests visited the Cornell Aeronautical Laboratory on February 22, 1955. At 5:30 P.M., Ira Ross, Director, greeted us and gave a general description of the laboratory. We were then conducted on a two-hour tour of the Laboratory facilities and were given the opportunity of seeing and hearing about some most amazing and advanced research projects. Highlights of the visit included an inspection and description of the 12-foot wind tunnel by Robert S. Kelso'43, the supersonic wind tunnel and the hypersonic wind tunnel where we witnessed a demonstration of winds of 10,000 miles per hour. An illustrated description of the work on air inflated buildings was most ably given by Walter W. Bird'34.

Following the program at the Laboratory, 53 members and guests gathered for a dinner meeting at the new Airways Hotel. — BENJAMIN C. BUERK'30, *Secretary*, 315 Grote Street, Buffalo 7, N. Y.

Chicago

For the following report your Secretary is indebted to Dick Steele'46: The March 1 dinner meeting of the M.I.T. Club of Chicago, held in the Main Dining Room of the Furniture Club of America, was notable for one of the largest groups of alumni wives to be seen at any recent meeting. Alumni and wives attending numbered about 100. After an excellent dinner President Robert Wise opened the meeting by expressing the deep sense of loss of all members in the recent death of John G. Praetz'28, former president of the Club and one of our most active Alumni.

The group then had an entertaining glimpse of "The Shape of Things to Come," a rapid tour via Kodachrome of some of the latest trends in architecture, conducted by Alfred Alschuler, Jr., '35, Vice-president of the Club and partner in the prominent architectural firm of Friedman, Alschuler and Sincere. From several collections of architectural pictures, totaling over 5,000 Kodachromes in all, Mr. Alschuler selected 180 beautiful views of homes, schools, factories and various public buildings. Geographically the subjects ranged from Europe to the now-famous "orange-peel" building at M.I.T. to the new Sands Hotel in Phoenix. As these slides were projected, the speaker commented on the salient features of each structure. A good deal of enthusiasm was generated in the audience, and a few of the wives were even heard to be pressuring their husbands for "new look" homes as they left the meeting. The lecture certainly was an inspiring and educational one, which we thoroughly enjoyed. We are in hopes that we will be able to have more as interesting. — ROBERT S. FAUROT, 2-44, *Secretary*, 4115 Ogden Avenue, Chicago 23, Ill.

Fairfield County, Conn.

At a recent meeting of the officers it was decided to hold the spring meeting during the last two weeks in April at the Clam Box, Westport, Conn. Fairfield County residents will be mailed notices giving the exact date and program. Officers elected at the last meeting are Gil C. Mott'37, President; Bailey Curran'29, Vice-president; Phil Epifano'39, Treasurer — DON WATERMAN'39, *Secretary*; 99 Flat Rock Road, Easton, Conn.

Hartford, Conn.

A series of meetings of unusual interest were lined up for the M.I.T. Club of Hartford for the year 1954-1955. We got off to a fine start on Thursday evening, December 2, with our fall meeting at which our speaker was Jack H. Frailey, who coached the 150 pound Tech crew which won international acclaim last year. Mr. Frailey told us of his many interesting experiences as coach, and showed a 16 mm. color film of the various heats by which his crew finally won the much coveted Thames Challenge Cup at England's 1954 Royal Henley Regatta.

The second event of the year took place at the Hartford Golf Club on February 24, when Erwin H. Schell'12, M.I.T. Professor of Industrial Management, came to Hartford to address the Hartford Alumni. Speaking on the subject, "New Frontiers at M.I.T.," Professor Schell lifted the curtain on some of the current research activities at the Institute of particular interest to the layman. Mrs. Schell accompanied Professor Schell to Hartford. A group of some 90 Alumni and their wives vastly enjoyed Professor Schell's entertaining disclosure of how our lives in the future will be influenced by Institute research projects. The speaker for our third meeting held in April was John E. Arnold'40, Associate Professor of Mechanical Engineering at M.I.T. He will present his popular talk entitled "Science Fiction." A joint get-together with the New Haven M.I.T. Club is planned for our Annual Meeting in June. — ROBERT D. MORTON'37, *Secretary*, 82 Sunset Farm Road, West Hartford, 7, Conn.

Kanawha Valley, W. Va.

A meeting of the M.I.T. Club of the Kanawha Valley was held at the Quarrier Diner in Charlestown, West Virginia, on March 7, 1955. Thirty members were in attendance for the pleasant social hour and dinner and for the interesting program which followed. This program consisted of a review by William S. Brackett'23, Vice-president of Carbide and Carbon Chemicals Corporation and member of the Visiting Committee on Chemical Engineering for the Institute, of a questionnaire which he had sent to the 44 M.I.T. chemical engineers in West Virginia. Thirty-four replies had been re-

ceived and these were the basis for a report to the visiting committee which was covered very ably by Mr. Brackett. Excellent comments on some of the factors considered weak points in the Institute's program should help the Institute in its future planning.

Members present at the meeting were: Malcolm M. Anderson'42, Donn W. Barber'42, Thomas W. Bartram'21, William S. Brackett'23, George B. Bradshaw, Jr., '40, Roy M. Crawford'34, Holden M. Dougherty'22, Ray M. Durrett'29, Charles H. Gilmour'31, Alexander S. Giltinan'47, Taj F. Hanna'52, William L. Hawes'22, Melville E. Hitchcock'37, Charles F. Hobson'11, Joseph C. Jefferds, Jr., '40, Ralph L. Kelly, Jr., '42, Robert W. King '42, Howard A. Kinzer'32, Jean P. Leinroth, Jr., '48, Richard P. Little'42, Howard P. McJunkin'43, Charles C. Neas'47, Arthur J. Power'42, John D. Ryan'51, Robert P. Slusser'47, Rush Taggart, Jr., '49, Garland T. Thayer, III, '49, Rolf V. Wallin'32, Alfred E. Winslow'47, Benjamin T. Woodruff'36. — DONN W. BARBER'42, *Secretary-treasurer*, 726 Grace Avenue, Charleston 2, W. Va.

Miami Valley, Ohio

On March 5 the Miami Valley Alumni initiated an informal luncheon meeting at the Dayton Engineer's Club with 11 members in attendance. It is planned to continue these noon meetings the first Saturday of each month. — EDWARD E. BARNEY'42, *Secretary*, 1720 Academy Place, Dayton 6, Ohio.

New York

The big news this month is that our new permanent Secretary, Joseph Conrad, is now installed at The Architectural League and has gone to work on our problems. His telephone number is MUR-ray Hill 5-8400. He will be very happy to hear from anyone connected with M.I.T. One of his first assignments is to arrange a program for next year's activities. Besides this he is also continuing with the exploration of suitable Club quarters, organizing placement activity, and assisting the affiliated Clubs.

Another very important event which occurred during the month was an organizing meeting of the Westchester Chapter of the M.I.T. Alumni Association. At this meeting there were 110 enthusiastic Alumni present, who unanimously decided to form a Westchester group. Many people contributed to this endeavor including a committee composed of J. Goffe Benson'35, Saxton W. Fletcher'18, Edward S. Goodridge'33, Alton E. Hittl'36 and Dale D. Spoor'22. The speakers at the first meeting who described the possibilities for such a club were A. L. Bruneau'38, President of the M.I.T. Club of New York, B. H. Nelson'35, Chairman of the Committee on Chapter Organization of the M.I.T. Club of New York and I. D. Jakobson'21, Chairman of the Alumni Association of Long Island, New York. From now on there is no question that we will be hearing more from these people as they proceed to organize their affairs. Dale Spoor was elected as temporary chairman. — M. R. McGUIRE'41,

Secretary, The Cooper-Bessemer Corporation, 25 West 43rd Street, New York 36, N. Y. JOHN E. PLANTINGA'45, *Assistant Secretary*, Meyer, Strong and Jones, 101 Park Avenue, New York 17, N. Y.

Northern New Jersey

Well, here we are back again for another monthly *tete-a-tete* and, to bring to you who were not able to attend, a report of our winter meeting which was held on Tuesday, March 1 at the Hotel Suburban in Summit. Some 100 loyal members and their guests were in attendance for the brief business meeting and for a most interesting and stimulating program that followed. President Jack Andrews'33 presided over the business meeting and called on several of the committee chairmen for brief reports. Sumner Hayward'21, Chairman of the Educational Council Committee, gave a resumé of the organization and activities of this committee as well as stating its objectives. The Educational Council has been set up by the Institute to expand and improve the work and coverage which has been done in the past exclusively by the Honorary Secretaries. Sumner also mentioned the fact that he is still in need of a few more Educational Counselors preferably from the classes of 1940 and thereafter. Treasurer Joe Wenick'21 reported briefly on the status of the Club's Scholarship Fund. Depending on the amount of money raised, the Club hopes to award a \$500 scholarship this spring, and tenable at the Institute this fall, to a noteworthy graduating senior of a New Jersey secondary or preparatory school. As of February 28, some 37 members of the Club have contributed a total of \$384. Have you contributed to this fund as yet? If not, why not? You know, the object is to have as many of our members as possible participate in this worthy cause so the actual amount given doesn't have to be large. If each and every one of our members gave just \$5 or \$10, we would more than meet our quota, and the monies raised in excess of \$500 are to be used in awarding another scholarship possibly next year. Remember, your contribution to this scholarship, honoring the 20th anniversary of our Club, is deductible for income tax purposes, so send it in today to: Joe Wenick.

Fletcher Thornton, Jr., '36, who filled in for the chairman George Ewald'37 (absent because of illness), then reported briefly for the program committee. Our final meeting for the year, the spring dinner meeting, is scheduled for Wednesday, May 11, 1955 at the Hotel Suburban in East Orange. However, since it is a dinner meeting, it will begin at 6:30 o'clock instead of the usual time. The speaker for this gala affair will be none other than John E. Arnold'40, M.I.T. Professor of Mechanical Engineering, Professor Arnold has gained national prominence for his unique courses in machine design; the most famous of which is Arcturus IV. The latter course has even been the subject of a very popular *Reader's Digest* article. The two objectives of the course are to teach the student to work in unusual surroundings and to attack problems which have never been attempted

before. Those of you who have heard him know that Professor Arnold is a most interesting and gifted speaker so do plan now to attend the May dinner meeting and make it an outstanding success.

Before closing the business portion of the meeting, President Andrews appointed Russell E. Lowe'16 to be chairman of a Constitution Committee, which he charged with the responsibility of re-evaluating our present Constitution and By-Laws and subsequently to propose the necessary amendments and revisions which will modernize them so as to better serve the current needs of the Club. Other appointments were: George F. Des Marais'20, chairman of the Scholarship Committee; and Fletcher Thornton'36, chairman of a Nominating Committee consisting of Newton S. Foster'28, H. Douglas MacDonald'22, Grover C. Paulsen, Jr., '40, and Emerson D. Callahan'49.

President Jack Andrews '33 then turned the meeting over to Everett W. Vilett'22 who introduced the speakers and served as moderator for the evening's program. The topic of the program was "Organization of Engineers for Collective Bargaining." To speak for the affirmative side, Ev Vilett introduced John E. Taft '47, Vice-president of the Engineers and Scientists of America. The E.S.A. is the national federation of collective bargaining groups (unions) of engineers, scientists and draftsmen. After leaving the Institute, Mr. Taft joined the Sperry Gyroscope Company which already had an engineers' association or union. Within a couple of years Mr. Taft became president of the Sperry Engineers' Association and it was while in this capacity that he communicated with other engineers' unions in other companies and helped to found the E.S.A. in 1953. Mr. Taft then briefly sketched some of the historical reasons for the development, growth and current status of such organizations.

To give the negative side of the question concerning the organization of engineers for collective bargaining, Ev Vilett then introduced Merton S. Adams, First Vice-president of the New Jersey State Society of Professional Engineers. Mr. Adams, who is also a director of the National Society of Professional Engineers, is associated with the New Jersey Bell Telephone Company as a division engineer. His talk was entitled, "The Road to Future Success for the Engineering Profession."

After the talks there followed a very lively and interesting question-and-answer period. To help in answering questions each speaker brought with him one or more guests. Mr. Taft had with him Mr. Arthur M. Marron, Chairman of the National Council of Western Electric Technical Employees; and Mr. Charles N. Hall, President of the Sperry Engineers' Association. Mr. Walter Stepanuk, President of the Meter Division Engineers' Association, Westinghouse Electric Corp. was also present. Mr. Adams had as his guest Mr. William Dean, past-president of the New Jersey State Society of Professional Engineers and an engineer with the New Jersey Bell Telephone Company. Following the program, the crowd lingered long in a social get-together and an informal discussion with the speakers

accompanied by the usual bountiful refreshments.

If perchance this reaches you in time, don't forget to mark your calendar for Wednesday, May 11, the date of our annual dinner meeting and the last meeting for this year. Hope to see you all there. As a last note, you might be interested in knowing that the Scholarship Committee met on Friday and Saturday, March 25 and 26 at the Military Park Hotel in Newark to interview some 111 applicants for scholarships this year including the Club's own 20th Anniversary Scholarship. — STUART G. STEARNS'39, *Secretary*, 25 Elmwood Place, Short Hills, N. J. JOHN T. REID'48, *Assistant Secretary*, 80 Renshaw Avenue, East Orange, N. J.

Schenectady, New York

The theme of this year was chosen to be "The Engineer's New Horizons and Responsibilities." Judging by the turnout at our monthly luncheon meetings, the topics of discussion chosen in the framework of this theme have been well received. Between 25 and 30 members turn out regularly at these luncheons. The range of subjects is varied: "An Engineer in Business" (G. G. Davis), "The Diving Rod and our Water Supplies" (Walter W. Aker'41), "Are Our High School Curricula Adequate for Technical and Scientific College Education?" (L. Gitzendanner). The annual club dinner was planned and arranged this year by Paul J. Hess'51. It is a matter of record that Paul pressed into service both Dave D. Adams'50 and Dick L. Matthews'50. It is known in club circles that Bud Wilson'45 was their undercover man, by virtue of his 1954 experience. Rumor, however, has it that Paul drew heavily on the moral support of his bride-to-be, in order to accomplish the fine job.

We welcomed to the meeting 65 Alumni and wives. Among them were the honorary secretaries of both the Albany and Schenectady Clubs, Messrs. John F. Longly'33 and Andrew P. Kellogg'24 and several Alumni from Albany and Troy, N. Y. Albert G. Dietz'32, Professor of Civil Engineering from M.I.T., spoke to us about modern home construction and showed us some of his fascinating slides of the shape of things to come about the house. It has been the plan of the Club to get into the community and further the cause of engineering education. In keeping with this aim, Jack Acton'50, President, welcomed a chance to speak to a group of Boy Scouts about engineering colleges. Three other speakers came to represent an Ivy League school, an agricultural college, and a small liberal arts college. — HANSJOERG STERN'50, *Secretary*, 1804 Hillside Avenue, Schenectady, N. Y.

Western Pennsylvania

On February 26 the annual dinner-dance meeting was held at the University Club of Pittsburgh. Twenty couples were present, and classes represented ranged from 1902 to recent graduates. A delicious dinner was served, after which we joined the regular University Club dance. This yearly affair is always great fun, and we

hope to see double the attendance next year. As time marches on, we find ourselves planning the last remaining meetings of the year. By the time this appears in print, we hope to have held our yearly Guidance Counselor meeting. At this meeting we entertain representatives of local high schools who are addressed by some representative of the Institute. Last year B. Alden Thresher'20, Director of Admissions, talked to about 75 local high school guidance counselors. Attendance this year will be somewhat reduced to save wear and tear on the treasury! By the time June rolls around, we will hope to have held a picnic and the annual business meeting. You may read subsequent issues of *The Review* to see if our aspirations were realized. Again, all Alumni in the Pittsburgh area are cordially invited to contact the Secretary and participate in our meetings. — WILLIAM M. LAIRD'43, *Secretary*, Box 242, Oakmont, Pa.

CLASS NOTES

• 1890 •

Henry Hayden, who took Course IV and followed it for a good many years before becoming connected with the Factory Mutual Insurance Company, fell and broke his hip last December. After a month in the hospital it had healed so he was able to get home, but now spends most of his time in a wheelchair. His daughter reports he would like to come to our 65th but can not. We extend our sympathy. Thomas Codman writes he is far from well just now but hopes he may be better by June. He sends best wishes for every success. Martin Southworth writes from Chicago that there is no chance of being able to attend our 65th, but sends regards to those who can be there. He states he attends most of the Chicago M.I.T. Club meetings. A wonderful picture of Willis Whitney appeared in the *Wall Street Journal* during February, obtained by a new General Electric "screen surface that amplifies light many times." If this is a recent picture we can thank God for his recovery. Frank Greenlaw is continuing his public-spirited planning and according to a Newport paper which has his picture at the top of the column has assisted "in the formation of a Newport taxpayers association on a non-partisan and non-political basis, with the aim of keeping a close watch on municipal expenditures."

Arthur B. Stearns died suddenly Dec. 14, 1954, aged 88. Taking Course II at Tech, he went to work for the Bigelow-Sanford Carpet Company, remaining there about 10 years, when he transferred to the Bath Iron Works. In charge of wiring, it was reported at one time they could not build a battleship without him as only he knew where all the wires went.

Don't forget that any contributions to the Alumni Fund this year will be doubled by an anonymous donor. — GEORGE A. PACKARD, *Secretary*, 25 Avon Street, Wakefield, Mass. FRANK M. GREENLAW, *Assistant Secretary*, 36 Bull Street, Newport, R. I.

• 1891 •

Charles Hancock Wood of Hotel Cornelian, Decatur, Alabama, wrote on March 15 as follows: "Dear Gorham: The last time I saw you was on one of those winter trips I took with the Appalachian Mountain Club into the New Hampshire mountains. I have not done any snow-shoeing since. After a long series of jobs I landed in Albany, New York, in 1908 as a bridge designer for the Barge Canal, and remained in the Department of Public Works until I had to retire in 1940 at age 70 as a Senior Civil Engineer. I continued to work a few hours a day for three or four years, without pay, just to occupy my mind. My work was the preparation of contract plans and specifications for steel structures, fixed bridges, bascule bridges, movable dams over the Mohawk River, and after official retirement I designed a few structures for the Thru Way. In 1910 I married an Albany girl, Margaret MacNaughton Thompson. She died in 1936, a few months after our silver wedding anniversary. We had three children, John Hancock Wood, Alexander MacNaughton Wood, and Charles Hancock Wood, Jr. John'34, has his own business here in Decatur, the Wood Lumber Company. He married a southern girl, and has three children, all girls. Alexander, Princeton, 1938, is married, has two children, a boy and a girl, and is vice-president of Johnson and Higgins, Illinois insurance brokers. Charlie, Princeton 1942, was killed in the Normandy landing, a second lieutenant of field artillery. I spend my time between Decatur and Winnetka, Ill., where Sandy lives. I like the South and the people. They are kind and friendly to this 'Damned Old Yankee.' My general health is good. I walk three and four miles every pleasant day. I love my grandchildren. Glaucoma has taken the sight of my left eye, but I have 20/40 'cataract vision' in my right eye, and can read and write. '91, '91, Rah! Technology! '91 — our class yell; or has my memory failed me? Very sincerely."

We are also happy to have received a letter from James W. Blackmer, from which we quote. "Dear Dana: I'm very sorry not to have answered your note before this. From 1892 to 1939, I worked continuously in Beverly and Salem. Superintendent of Water Works in Beverly from 1897 to 1914 and Commissioner of Public Works for City of Beverly from 1914 to my retirement in 1939. For recreation I have always had quite a good vegetable garden. In fact, I now have in my cellar a portion of my 1954 crop of 258½ pounds of butternut squash. I still drive my own car, and physically am apparently in good condition. Very truly yours." — GORHAM DANA, *Secretary*, 44 Edgehill Road, Brookline 46, Mass.

• 1892 •

We regret to report the death of Mr. Dwight Parker Robinson, at his home, Pocasset, Mass., on March 17, at the age of 86. He graduated with us in the course in electrical engineering and served for one year as an assistant instructor on the mechanical engineering staff. The Secretary is indebted to the *Boston Herald* for the following summary of his career.

"A native of Wareham, he was graduated *cum laude* from Harvard, and from M.I.T. in 1892. Until his retirement 11 years ago, he had been president of Dwight P. Robinson and Company, Inc., New York engineers and constructors. In New York, he also headed the United Engineers and Constructors for several years. He went with Stone and Webster in 1893, specializing in public utilities management. Later, he served as president of Stone and Webster Engineering Corporation, as a partner of Stone and Webster and as president of American International Shipbuilding Corp. Mr. Robinson was well known for his engineering work on power plants and in construction for steel companies. At Harvard he was a member of the committee appointed by the Board of Overseers to visit the Engineering School and from 1925 to 1926 he was president of the Harvard Engineering Society. He was a fellow of the American Institute of Electrical Engineers, a member of the American Society of Mechanical Engineers and Franklin Institute. He leaves two sons, Powell, of Morristown, N. J., and Dwight Parker Robinson, Jr., of Brookline." Robinson was with us at our 60th reunion three years ago this spring and we shall always remember him as a loyal friend and pleasant companion.

The Secretary is indebted to Edward Wells, for the following extract from a recent issue of the *Dayton Daily News* regarding our classmate, Fred Meserve. "Lloyd Ostendorf of 225 Lookout Drive, author of the article in this issue of *Camerica* on the lost Lincoln letter to Ohio Democrats, appears in the accompanying photo with F. H. Meserve of New York City, nationally known collector of photographs of Abraham Lincoln and other famous personages of the 1840-1890 period. A correspondent of Meserve's for some two years, Ostendorf had occasion to visit him in New York recently. Meserve's photographic collection numbers some 200,000 items, Ostendorf says, including many old glass negatives, and prints are made readily available at negligible cost to researchers. Now 89, Meserve began his collection more than 50 years ago. He considers himself a historian rather than a collector, however, and his opinions and advice on Lincolniana are eagerly sought and generously given. According to Ostendorf, a forthcoming issue of a national magazine will use one of Meserve's Lincoln photographs on its cover. Another such weekly refused to publish a newly found and previously unknown photograph of Lincoln until Meserve had first declared it authentic. Meserve's collection is variously valued at \$300,000 to \$1,000,000. He would sell it only as a unit, he says, and hopes to see it preserved eventually by some institution. But he has never maintained it as a money-making enterprise. Ostendorf says it is the largest private collection of the sort in the country." Congratulations of his classmates are due to Fred Meserve.

The Secretary hopes that as many '92 men as may be able will attend Alumni Day this coming June. — CHARLES E. FULLER, *Secretary*, Box 144, Wellesley 81, Mass.

In answer to President Page's letter we have a note from Cadwallader Washburn stating: "We left Brunswick (Maine) permanently on December 27, and settled in Brunswick, Georgia. Strange as it may seem to you, I am not in retirement but still in harness. Today (March 19, 1955) closed in Philadelphia a one-man show of my work." We are sure Cadwallader Washburn has had a most interesting time traveling throughout Europe and the United States in connection with the exhibits of his work. His new address is: 1411 Sycamore Avenue, Brunswick, Ga. We have a new address for Alden R. Palmer: 215 Fourteenth Avenue, N. E., St. Petersburg 4, Fla.

Please note that Monday, June 13, will be Alumni Day. We hope as many as possible will plan to attend. The details of the Class of 1893 luncheon and meeting will be sent to you during the early part of May.

The following is a message from President Page: "It may be interesting for our classmates to know that following the letter that was sent out last fall and winter requesting information concerning activities since leaving Tech, there have been 21 replies, which I think is very commendable. I am sure that all of us read the notes with considerable interest. In the letter that I received from Emil Lorch, he made a postscript inquiry in handwriting to the effect that he wondered why I should not make the same report, to which I replied that I thought his query was entirely in order and that I would do so in one of the fall issues. I am not very good at writing these things so I thought after reading the interesting reports from so many of our classmates I would receive some clue as to what to say. There are still 28 whom we have not heard from so I hope that those who have not sent in a report will join me next fall and winter in sending in some notes for our Class news." — GEORGE B. GLIDDEN, *Secretary*, 99 Chauncy Street, Boston 11, Mass. GERTRUDE B. CURRIE, *Assistant Secretary*, c/o Fay, Spofford and Thorndike, 11 Beacon Street, Boston 8, Mass.

• 1894 •

The Secretary is again on the job after he and his wife have had a month's absence in Florida in pursuit of pleasure and possible relief from arthritic trouble, and it is pleasant to be in Cambridge again. Sunny Florida was not entirely warm in its reception, but the friends we visited and met were so cordial that this lapse on the part of the weather man can be forgiven. Ten days with old friends on the shores of the Gulf at Indian Rocks Beach were greatly enjoyed, and the Secretary did much pleasant fishing, but with small results to show for it. Thereafter, two weeks in the heart of the orange country at Orlando gave another opportunity to see the great developments in the citrus industry as well as to renew many friendships. While in that city the Secretary called at the home of Walter V. Brown, and although he was enduring another siege in the hospital, a pleasant interview was had with Mrs. Brown. About eight years ago, after Walt-

er's retirement from his position with the Telephone Company in New York, they selected Orlando as their home base, but sometimes spent parts of the summer in Maine at their Belfast summer home. As Walter had to undergo some surgical work last spring, they made no trip north in 1954 and so had to miss our sixtieth reunion. We hope that after the present check up, Walter will have many years of good health.

It is pleasant to report that George Owen is once more in excellent health after his few weeks in the hospital. He was on hand to represent the Class officially at the February meeting of the Alumni Council; a meeting the Secretary had to miss with much regret, but an interesting telephone conversation with George has made it possible to give the above comment.

Arthur Shurcliff is a versatile chap, for in addition to his remarkable work as a landscape engineer, he also writes charmingly both in prose and verse. The Secretary recently noted on the "Home Forum" page of *The Monitor* a very interesting short article headed "Wagon Trails," and descriptive of the trek to the great west in the early days. This article was taken from a book entitled *A Man Walks the Earth*, copyrighted by Shurcliff in 1951. John E. Wray sends in a note stating that his address is still with the St. Louis Post *Dispatch*, on which he has been a reporter for years and years, at 1111 Olive Street, St. Louis. Teddy Horton has reported from Sandwich, Mass. on the Cape, where he has lived since retiring from official professional work in New York State.

These notes, unfortunately, must have their sad aspects. For a long time we had not heard from Dudley C. Chaffee, one of our well known architects. The information has now been received that he is deceased, but no date was given. He had lived in Lexington, Kentucky. It is also sad to report the death of Leslie Dana, who was with the Class for two years, at his home, 1 Brentmoor Park, St. Louis, on January 3, 1955. For many years Leslie was prominent in the business life of St. Louis. Our sympathy is extended to Mrs. Dana and their son George, who came to Tech in the Class of 1929. — SAMUEL C. PRESCOTT, *Secretary*, Room 16-317, M.I.T., Cambridge, Mass.

• 1895 •

Your Secretary has no evidence in hand to warrant holding an organized 60th Reunion of the Class in June, 1955. Most of the living mates in New England are incapacitated and unable to attend such an affair, while a few others are disinterested and several others are too far from Boston to make the trip. Mrs. Yoder and your humble servant will at least try to attend the Alumni Day Luncheon to greet anyone who may eventually have the courage to appear. If anyone of our mates perchance decides to attend, please notify your Secretary — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

• 1896 •

A number of inquiries have come to hand regarding my "spell of sickness." I

have avoided sharing my burdens with our readers as I find many of you have been involved with similar afflictions which are a part of eighty (80) years plus, Willy-Nilly. Pleural pneumonia in November with an earlier cataract operation followed by a complete and rigid check up, with X-rays and needles in endless rotation, prompting surgery of a nature very common to my age and level, finds me today going over the stairs with some degree of caution and venturing outside occasionally. I wish at this time to acknowledge communications and queries from those of you who have known of this situation. Especially devoted has been Fred Damon in his attention to a wounded comrade. The future seems to have much promise for a return to normal.

Word coming from Irving Merrell from Florida indicated that his years are weighing somewhat heavily on his physical status, and he regrets that he does not feel equal to giving us a biographical sketch of his famous career. Note: As a must the reading of an article in this May issue of *The Review* regarding a merit citation given at the M.I.T. Regional Conference in Cleveland to Paul Litchfield. "Mr. Litchfield it is especially fitting that we pay tribute to you tonight at the close of this year's National Engineer's Week, whose theme has been: 'Engineering—Builder of a Brighter Future.' It is appropriate too, that your fellow Alumni pay tribute to you on an occasion of this kind. We know well your services to the Institute, including your support of chemical engineering and your part in the Development Program of 1950. Your two five-year terms on the M.I.T. Corporation, representing the Alumni Association of which you were the 36th President—the same year Jim Killian was made the first treasurer of the Association." We have on hand ten (10) volumes of our 1896 twenty-five year book which can be obtained, free of charge by simply writing to the Secretary. They should be a valuable addition to your academic library.

We received the following clipping from the Cleveland, Ohio, *Plain Dealer*: "Marks Half Century in Architecture Here—The architectural firm of Garfield, Harris, Robinson and Schaffer, 1740 E. 12th Street, comes into its 50th year this year. . . . Abraham Garfield hung out his own shingle at the corner of Euclid Avenue and E. 6th Street in 1905. Son of the 20th president of the United States, he had graduated from Williams College in 1893, M.I.T. three years later, traveled widely in Europe, and had just previously been five years partner in the firm of Meade and Garfield.

"Concerned largely with domestic planning in the beginning, the firm steadily broadened its scope burgeoned into successive partnerships, and today has a staff of 41. . . . His profession has repeatedly recognized Abraham Garfield. He has served twice as president of the Cleveland chapter of the American Institute of Architects, again as director and vice-president and fellow of the national institute. He was one of a group that helped found the School of Architecture at Western Reserve University. For 13

years he headed Cleveland's City Planning Commission. President Coolidge appointed him to the Fine Arts Commission, a body of half a dozen who pass on all projected government building plans for Washington, D. C.—top honor in the profession."

Your Secretary also received a postcard from Egypt with a photograph of some pyramids and camels from William D. Coolidge: "March 3, 1955—On a Mediterranean Cruise of the S. S. *Independence*, now at Alexandria and leaving tonight for Beirut and the Holy Land. Visiting a total of 20 ports, with shore excursions in hands of American Express Company. Was glad to revisit Pompeii, which I first saw in 1899. Love to you and Belle and all of '96 from Dorothy and W. D. Coolidge."—JOHN A. ROCKWELL, Secretary, 24 Garden Street, Cambridge 38, Mass. FREDERICK DAMON, Assistant Secretary, Commander Hotel, Cambridge 38, Mass.

• 1897 •

Proctor Dougherty has been most helpful to your Secretary Pro-Tem by sending in news regarding members of the Class. He writes there are two other classmates living in Washington who are now retired but up to date he has been unable to get news from either of them. However Proctor has thoughtfully sent me a copy of an interesting letter he wrote to Professor Emeritus Sam Prescott which follows: "My dear Sam: I have read every word in your book *When M.I.T. was Boston Tech*, which you so graciously autographed for the University Club. From the very beginning I found it thrilling since I have lived through some of the periods. Your historical background of William Barton Rogers was a masterpiece and told many things I did not know, even though I have his two volumes *Life and Letters* (1900) in my home. As for Professor Runkle, I knew him personally and loved his book on math.

"Dr. Francis A. Walker's open door invited me in several times during my four years for advice and encouragement. At his funeral in Trinity Church I was one of the Senior pall bearers. Wilfred Bancroft '97, President of the Class, led in getting a suitable memorial. Then came our Walter Humphreys who was registrar then secretary of the Corporation. Harry W. Tyler '84, I knew as secretary of M.I.T. and later in Washington, after retirement we made him president of the Washington Society of M.I.T. for several years. As a presiding officer at our local meetings he was out of this world and packed the house. Many here attended his funeral in the Washington Cathedral.

"Your reference to Ike Litchfield '85 whom I knew well and to myself in connection with the great Alumni meeting in 1904 as coming from Chicago and Washington respectively to help protest the proposed merger with Harvard awakened memories of our battle for an independent M.I.T. Of course I knew personally James Knox Taylor '79 when he was supervising architect of the Treasury Department designing federal buildings. And your reference to Professor Samuel H. Woodbridge and his work at the Capitol building touched me

deeply for I was employed with him as an assistant on illumination problems. At the final Symphony Hall meeting at the time of the dedication of the new buildings, you noted the presence among the guests of Honorable Frederick W. Dallinger, who at that time was representative in Congress from the old 8th Cambridge District, brought back memories when we were boys together and chased butterflies. When he came to Washington we frequently had him for Sunday dinner. After retirement from the House and as a judge in New York Federal Court, he is spending his days as a victim of arthritis, in a wheel chair at his old summer home in Center Lowell, Maine, overlooking the lake. And so your book went on page after page every paragraph a thriller and finally the dedication of the new buildings in Cambridge. It was a treat to have read it. Thank you. Cordially, Proctor Dougherty '97." From a perusal of the 1954 Report of the Town of Kennebunk, Maine, there came to our attention the death of Charles Ewing, aged 82, on December 23, 1954. This undoubtedly refers to our classmate Charles Ewing who had a summer residence at Kennebunkport. It will be recalled that among other activities he was the art editor of the '97 *Technique* published in our Junior year. His clever and artistic drawings and sketches added much distinction to the book. He was a widower, his wife a member of the well-known Parsons family of New York, having died a few years ago. Our only personal contact with Charles Ewing since graduation was around 10 years ago, when for a period of a few years he and his family were residents of Milton, Mass. Having taken Course IV, he spent his active years as a distinguished architect.—JOHN P. LISLEY, Secretary Pro-Tem, 26 Columbine Road, Milton 87, Mass.

• 1899 •

Carroll W. Brown and members of his family jointly own a tract of woodland that was visited by both "Carol" and "Edna" and a great deal of heavy damage was done. So Carroll Brown and his brothers spent a full week at Thanksgiving time surveying the downed timber to determine the amount of salvaging that could be done. Hard luck, Carroll, to have had two big blows cover the same tract.

One of Fred Waddell's sons who has been living in recent years at Chevy Chase and working for Pratt and Whitney, has been transferred by that firm to their research plant in California. Recently Fred has been made a life member of his Rockport (Mass.) High School Alumni Association from which institution he graduated in 1892.—BURT R. RICKARDS, Secretary, 381 State Street, Albany, New York. MILES S. RICHMOND, Assistant Secretary, Little Compton, R. I.

• 1900 •

Replies continue to come in from those who hope to attend our reunion at The Pines in Cotuit, Mass., on June 9 to 12. Be sure to send in your request for reservations to Mr. C. D. Crawford at The Pines promptly.

We have received word of the death

of George A. Tweedy at Phoenix, Arizona, on January 21. He graduated with us from Course III. Mrs. Tweedy writes as follows: "Mr. Tweedy was active in mining circles throughout the West during his entire life. He operated a gold mine for the old Bradbury estate in Old Mexico at Rosario for 12 years. After that he served as a mining consultant in Los Angeles for a great many years. In Phoenix he was connected with the Reconstruction Finance Corporation for six years. He was a member of the First Presbyterian Church in Phoenix and of Sigma Chi Fraternity. A retired mining engineer Mr. Tweedy, a native son, was born in Downey, Calif., and was active in mining all through the development stages of the industry in the West. Funeral services were held in the Chapel of the Chimes in Inglewood Park Cemetery (California) on Thursday, January 27. He leaves his widow, Mrs. Margaret A. Tweedy; a stepson, Donald A. Acton; three daughters, Mrs. Mack Singer, wife of Culver City's school superintendent; Mrs. William DeLapp of Pacific Palisades, and Mrs. Bert Terwilliger of Alhambra; and a son, George A. Tweedy, Jr., connected with the American Oil Company in Saudi Arabia. His survivors also include five grandchildren and three great-grandchildren."

Harry M. Thayer, who was unable to come East for our reunion last year (we hope that he will be with us next June) sent a few brief notes of his career. He lists as his principal professional positions that of plant superintendent for Procter and Gamble in Kansas City and Port Ivory, New York, and general works manager for N. K. Fairbanks Company. Later he was associated with Ward, Wells and Dreshman of New York, philanthropic fund raisers. He has retired and now lives in Covina, Calif. He is connected with the Presbyterian Church in Covina, has been President of Trustees and Chairman of the Building Committee and is now the Ruling Elder. His hobbies are gardening, and church and civic work. He and Mrs. Thayer have three sons and five grandchildren. — **ELBERT G. ALLEN, Secretary**, 11 Richfield Road, West Newton 65, Mass.

• 1901 •

It is always pleasant to take notice when one of our illustrious classmates is given a distinct honor. This time it is Anna Billings Gallup and I quote in part from a news clipping which tells of this honor. "Miss Anna Billings Gallup of Mystic, Conn., and for 35 years with the Brooklyn Children's Museum, the first in the world so specialized, and for 34 years its curator-in-chief, goes to New York to receive a gold medal. The William T. Hornaday Memorial Award will be presented to her the next day by John Forbes, director and secretary of the National Foundation for Junior Museums, accompanied by a citation for her 'many years of distinguished leadership.' It is the second gold medal to come to Miss Gallup, for in May 1930, while still active with the museum, she was awarded one at the annual dinner of the National Institute of Social Service in New York."

I have a wealth of material to work

from, thanks to you who have replied. (27 on March 11) I will start with those who sent their news in early. Arthur C. Davis, V, of Gloucester: "I am still attending to business daily, not yet ready to retire as I am in good health and enjoy my work. I have two children, three grandchildren and three great-grandchildren. Wonder if this may be a record for the Class." Mrs. Alice Bowen, who graduated in Biology, says: "Today I am getting very well acquainted with doctors, nurses and hospitals. It is most interesting and these are wonderful. I flatter myself that my early training in M.I.T. gave me a very great appreciation of the functioning of natural law and so I understand the 'lingo' of all these very busy people. I am retiring after a very full 33 years as school principal, always hoping for something to turn up whereby I could return to my studies in M.I.T. Instead I read from cover to cover *The Review* and am thrilled at the accomplishments and those who, like me, had absorbing ambitions and 'arrived.'" Ward Coburn, X, from Birdsboro, Pa.: "Starting late last summer, I have led anything but a quiet life. First I tried to climb a telephone pole without getting out of my car. After a couple of weeks waiting for my ribs to knit, the coast of Maine became attractive, Yarmouth on Casco Bay to be exact; a spot Al Higgins used to enjoy. While there Hurricanes Carol and Edna paid us a visit and we looked them right in the eye. By hurrying home to Berks County, Pa. we met the third sister head on, Hurricane Hazel. Ever since our motto has been 'Blow the man down.' Otherwise my life, that of a self-employed professional, metallurgical engineer, has been quite peaceful."

From Charlie Danforth, X, of Youngstown, Ohio: "I have your letter of class news. It grieves me that so many of these fellows are passing away. I knew Joe Evans very well. We got acquainted on the football field. I am sorry that he cannot continue to function as class president. As for me, I am still batting along, working seven days a week, trying to bring my business in shape so I can dispose of it and get out from under. This diamond business differs greatly from any other business. At the close of the Korean festivities the diamond market went to pieces. We managed to keep going, laying up diamond which we could not sell. Recently the price and demand has improved very greatly; probably the price of diamond powder is too high at this moment. We are making pretty close to 10,000 carats of industrial diamond powder per month. Our health continues to be very fine. A few months ago my doctor discovered that my blood was in bad condition. The doctors at University Hospital, Columbus, gave me a shot of radio-active phosphorus, and since that time I am feeling better than I have for five years. They tell me now I have 60 more years to live. The only thing I have had to worry about was that somebody with a Geiger counter might get too close to me and stake out a uranium claim on my person. Mrs. Danforth continues to enjoy the finest of health and it looks like we will be around here for a few years more." Donald A. Kohr, V, of Day-

ton, Ohio, writes: "Like yourself, I am sorry that our Class has lost so many members since you last reported. Because I had a degree from Ohio State University when I came to M.I.T., I received my Course V degree in one year's time and so my acquaintance with members of the Class other than those in the chemistry course was very limited. The only news that I can give you concerning myself is that last summer, because I was almost halfway through my 77th year, I made arrangements to relinquish my position as President (of the Lowe Brothers Company) in favor of our Executive Vice-president, and since October, 1954, my title has been Chairman of the Board, with the understanding that I could go and come pretty much as I pleased, a privilege of which up to the present time I have not availed myself."

Austin T. Hyde, V, of Damascus, Va., says that he has been fully retired since January 1, 1955. For the benefit of those who have sent kind wishes to Mrs. Taft and myself, I have to report that she passed away very suddenly on February 22. — **THEODORE H. TAFT, Secretary**, Box 124, East Jaffrey, N. H. **WILLARD W. DOW, Assistant Secretary**, 78 Elm Street, Cohasset, Mass.

• 1902 •

A more complete sketch of Newell C. Page whose death was noted in the last notes is given by the Winchester *Star* as quoted: "Professor Newell Caldwell Page, Emeritus Professor of Electricity in the Department of Physics at the Massachusetts Institute of Technology and a teacher there for 43 years until his retirement in 1945, died at his home 28 Maxwell Road, Tuesday afternoon, February 15, following a brief illness. Professor Page was the son of Charles W., and Sarah (Knight) Page. He was born July 3, 1880, in Newburyport and grew up there graduating from Newburyport High School in 1898 as valedictorian of his Class. After his graduation from M.I.T. in 1902, he returned to the Institute as an instructor in the Department of Physics, and during his years of teaching advanced to full professor through the posts of assistant professor and associate professor. He was for 15 years until his retirement professor of electricity. His long service to the Institute stressed teaching rather than research. Professor Page married Harriett Atkinson of Newburyport, September 10, 1907, coming to Winchester with his bride at the time of their marriage. During their 47 years in town they lived at their Maxwell Road address, spending their summers at Cape Porpoise, Maine, until their cottage was destroyed in the forest fires of 1947.

"Aside from his teaching skill, Professor Page's accomplishments were many and varied. He played the piano and flute well, and was an excellent amateur photographer. He had a wide knowledge of birds and plants, and in his more active years grew beautiful flowers. Perhaps the hobby he enjoyed most was working with his hands, and evidence of his skill in wood and metal working was everywhere in his home, while there were few times after his retirement when he was not successfully coaxing several antique clocks

back to regular timekeeping. Many a neighbor in trouble had cause to bless his knowledge of tools and their use and he was never too busy to lend a hand when needed. Among the unusual examples of his ingenuity and skill as a craftsman is an exact replica of an old Newburyport electric car, complete with controls, electric lights, and tip-over seats, a real museum piece. As his health failed and his eyesight grew dim he devoted himself to his huge cat, 'Snooky,' who was never far from his master's side, day or night. Held in esteem by all who knew him, Professor Page was genuinely beloved by those who knew him intimately. The last of his family, his wife, is his only survivor."

Although this is being written in March you will read these notes in May so it is in order to suggest that you resolve now to be at the '02 table in the big tent on the coming Alumni Day luncheon. — BURTON G. PHILBRICK, *Secretary*, 18 Ocean Avenue, Salem, Mass.

• 1903 •

We are glad there are no obituaries to record this month. Apparently it is one of those months when there are "no hits, no runs, no errors." Our Secretary, Fred Eustis, is spending the winter in Jamaica, the usual ones of the Class who generally go to Florida, we assume went. In a roundabout way, we understand that Tom Sears was there, and we hope he was able to get the two or three others together for a small reunion somewhere. Next June is our 52nd anniversary, and we are wondering if there is any desire for a reunion. This issue, as all of them this year, goes to all the Class, so if there is any interest in a reunion, please let us know before the next issue. The Secretaries will be only too glad to make arrangements and plans, if we can know in advance. — FREDERIC A. EUSTIS, *Secretary*, 131 State Street, Boston, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, Box 103, South Wellfleet, Mass.

• 1904 •

Due to his fall several weeks ago, the Class Secretary is still incapacitated. Although Mr. Stevens is still unable to use his right hand for assembling class notes, he is recuperating very nicely, and informs us that there will be ample material submitted for the June issue of *The Review*. — *The Review Editors*

• 1905 •

In spite of the fact that your committee felt (and still feels) that they had a firm contract with Stoneleigh Gables as the spot for our Fiftieth Reunion, the management of that hotel cancelled their arrangement the latter part of February. We were indeed fortunate to find accommodations at The Belmont, West Harwich, Cape Cod, Mass. for the same date. Notice to this effect with full information was mailed early in March to everyone on the class roll (260).

The tentative enrollment as of July 1954 was about 120, divided approximately 75 men, 45 ladies. Since everyone can by now tell as to their plans, and since we are offering the very best in everything, this number should increase

appreciably. Your committee hopes that everyone will arrive at least by mid-afternoon on Friday (June 10). Also that everyone when leaving will go to Cambridge for Alumni Day, the luncheon at noon, the banquet at night, with opportunity to look over the new M.I.T. on Monday morning and afternoon. Those having hotel accommodations in Boston for Sunday night may wish to leave The Belmont Sunday afternoon. Others will drive up Monday morning.

Bob McLean, who by the way is spending all his "hobby time" endeavoring to increase the percentage of contributors to our Fifty-Year Gift, refuses to accept the role of hero, placed upon him in our January account of Hurricane Carol. He says he was too busy trying to escape Carol to play the gallant. In the same issue we pulled a boner, which, so far, no one has commented on. This said "Peg Ball, whose cruiser 'Rabbit Ears' some of you have ridden in, was riding at anchor in Cotuit Harbor," and so on. She wasn't riding at anchor at all. Wasn't even dressed for bathing.

Roy Allen, I, enroute to Mexico, where he was to spend a month in touring, tells of a visit to Willard Simpson, I, whom he found hale and hearty and still very busy in heavy contracting. Roy enclosed a clipping (half page including photograph) telling of an approaching meeting of the Texas Society of Professional Engineers at which Simpson was to be named "Engineer of the Year." Willard is at present chairman of the board of trustees of the City Public Service board, a sponsoring member of the San Antonio Symphony society and a life member of the San Antonio Livestock Exposition. He is a thirty-third degree Mason. The rest of the article you will have to read at the coming reunion, which Willard and Mrs. Simpson expect to attend. Either Roy or Willard have seen Ed Graham, III, at Graham, Texas. Ed probably cannot make the reunion on account of poor health.

Through Grove Marcy we learn that Al Prescott, II, and Mrs. Prescott are visiting a daughter on a mountain side just outside Honolulu. Clarke Warren, II, writes, "After 57 years residence in La Grange (Illinois) we are moving to Traverse City, Mich., where we have a small house located on top of a hill overlooking Grand Traverse Bay. I was retired three years ago as president of the Mackie-Lovejoy Company and am now self employed in sales engineering and accounting. After March 1, my address will be c/o R. C. Warren and Company Inc., RFD #1, Traverse City, Mich."

A letter from Mrs. Fred Simonds, I, tells of Fred's last illness. They had moved back to Concord, Mass., only a few years ago, as Fred's illness had caused his retirement. He was operated on in January, 1952, a malignancy, which spread gradually and caused his death in December, 1954. Both Fred and Mrs. Simonds were members of pioneer Lexington (Mass.) families. Fred was associated with Buck-Seifert and Jost Company, consulting engineers for many years, residing in Ridgewood, N. J., where he was an elder in the First Presbyterian Church, a member of Fidelity Lodge A.F. and A.M. and of Bethlehem Commandery.

During World War II he went to the West Indies to assist in the design and construction of water and sewer facilities for the U.S. Army bases there. Word has been received that Edward C. Grant, XIII, died following an operation on December 9, 1950. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston, Mass. GILBERT S. TOWER, *Assistant Secretary*, Main Street, Cohasset, Mass.

• 1906 •

The Secretary received a letter from Ernest M. Smith, II, dated February 16, advising of the death of Lewis A. Riley, II. The notice of Riley's passing was included in our notes in the March Review. Ernest's note stated he was planning a golf trip to Southern Pines and had written Riley to meet him in Washington. The note also carried the information the writer was planning to attend the 50th (now 13 months away) with Max Coe and Pete Stanley. Although it is early to request definite registrations for the big event, it is very heartening to hear about those already planning to attend. We would welcome similar good news from other readers. It occurs to your Secretary that we would increase our attendance by featuring such information in this column in the nine issues between June 1955 and May 1956. Incidentally, Smith's address is Wildbore Farm, Old Chatham, New York, where he has been located since 1946. Frank Benham returned from his motor trip to Florida on March 4. He had a visit with Ralph Patch at Winter Park and found him quite well and enjoying his southern holiday. Your writer was in Simsbury, Conn., on March 15 to assist in the celebration of the fourth birthday of one of his grandsons and he took the opportunity to try to get in touch with Jack Ross, III, who lives in West Hartford. Having no luck contacting him on his telephone, we called his brother's residence and learned that Jack spends his winters in Clearwater, Fla. It was also learned that he plays golf there. He retired as Chief Engineer for the City of Hartford in 1948. His name should be added to the list of the '06 migrants to Florida included in the April issue. There are two address changes of interest: Joseph T. Lawton, II, to Waynesboro, Va., from Baltimore, Md., and H. K. Merrow, X, to Boothbay Harbor, Me., from Hyde Park, Mass. — JAMES W. KIDDER, *Secretary*, 215 Crosby Street, Arlington 74, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

• 1907 •

Ed Marsh, 18 Skywood Road, Chap-paqua, New York, wrote me on February 17 as follows: "This is being written in bed, at home, where I am recuperating from an emergency operation to remove a gall bladder three weeks ago. I was a poor candidate for major surgery with a 'bum' bellows and equally 'bum' pump, which went back on me last December. However, I was in good hands and withstood an hour and a half of anesthesia without any trouble, and the tank of oxygen put in my room while I was in

the operating room was never used. It's wonderful what they do these days! By the third day I was sitting in a chair, and by the fourth day they had me walking across the hall. Best wishes to you and all the '07 crowd whom I once knew."

Henry Martin, 39-41 Langley Courts, Washington 16, D. C., wrote me a cordial note on March 3, seeking information regarding some of our classmates. He is at present supervising civil engineer at Quantico, Virginia, Marine Corps Schools. Fred C. Mabee, associated with our Class in Course X (chemistry), who for many years was professor of that subject at Bates College, Lewiston, Maine, is now a professor at Howard College, Birmingham, Alabama. 131 Easterly Street, Santa Cruz, California, is a new address for Dr. Selden E. Rockwell, a graduate with us in mechanical engineering. I do not know what his business or professional activities are at present. Here in Whitinsville, Mass., Phil Walker and I, together with our families, continue to be blessed with first-class health and lots of energy to carry on our varied activities. Phil has manifold responsibilities in connection with his position as maintenance engineer of Whitin Machine Works, and also in his various offices in local banks, library, and other community projects. He and I are both elders in the local United Presbyterian Church, and we are frequently on committees together, both there and also in connection with our mutual interest in religious work in other organizations in New England. My own work at Whitin Machine Works is by no means as important as Phil's, and yet as librarian of our company technical library and with many varied duties of a general executive nature, I keep happily busy every day of the business week. I hope you fellows will not construe these personal words about myself as indicating a spirit of conceit. As news about '07 men is scarce this month, and as it is a rare occurrence for me to report regarding your two Whitinsville classmates, I thought I would include the above statements.

At just about the time you are reading these notes, you should be receiving from me the detailed announcement regarding our 48-year reunion at Oyster Harbors Club, Osterville, Massachusetts, June 10 to 12, the dates reserved by us since June of 1952. Note that I am suggesting to you that, if possible, you plan to join Phil Walker and me in staying over Sunday night and until after breakfast on Monday, June 13, and then driving to Cambridge for the festivities of M.I.T. Alumni Day on that day. On the registration slip that forms part of my announcement, there is space for you to indicate your intention of following this suggestion. Would that I had sufficient power of persuasion to influence all of you to attend this reunion! I'll guarantee you a grand good time. So please send along your registrations promptly. Keep in mind the offer by an anonymous donor to double any contributions to the Alumni Fund. Send in your check. — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. PHILIP B. WALKER, *Assistant Secretary*, 18 Summit Street, Whitinsville, Mass.

• 1908 •

The third dinner meeting of the 1954-1955 season was held at the M.I.T. Faculty Club Wednesday, March 9 at 6 P.M., with the following present: Bunny Ames, Bill Booth, Nick Carter, Myron Davis, George Freethy, Sam Hatch, and Joe Wattles. Leslie Ellis and Linc Mayo were sojourning in Florida so couldn't be with us while other "regulars" had previous engagements which accounted for the small attendance. After cocktails in the lounge with the usual "gab-fest" we adjourned to our private dining room for the usual very excellent meal. Joe had kind of run out of pictures so we didn't have our usual Kodachromes. However, Joe told us he is visiting Venezuela shortly so we may have some at our May meeting. We were glad to hear from Carl Bangs at Rome, Georgia, who wrote as follows: "I have been intending to drop you a line advising of change in street address for sometime, and after reading Gus Weiler's comments in the February issue of *The Review*, felt I better do it now before I get into his class (?) Due to the section where we are located being taken into the city, our street number has been changed from 5 Turner Chapel Road to 11 Turner Chapel Road. Will you please pass it along so that the Alumni Association and anyone concerned will have correct listing. I can hardly wait from month to month for *The Review* to see what is in the 1908 news for although I am pretty much in the groove do like to hear about others. I retired from the Celanese Corporation of America on December 31, 1953. We had decided previously to make our permanent home here, as we had been in Rome for 25 years, had made friends, liked the climate and the country. This northwest section of Georgia is hilly and rugged, being only a short way to mountains 4,000 to 5,000 feet high. Although I have not done a lick of productive or creative work engineering or otherwise this past year, I've had a lot of fun doing what I've been doing. There is about an acre of land on the place fully devoted to lawn (and weeds) which provides exercise when needed, but comes under general nuisance heading otherwise. Enjoying being on the move when desire arises, it's fun to be free to get in car and go when and where we please. They may talk 'traffic' down here, but there's a lot of open road to roam with minimum congestion. So, like Gus Weiler, if I can keep as frisky as I am now, God willing, I'll be at the 50th reunion. Sincerely yours, Carl H. Bangs."

Also from Charlie Steese at Boulder City, Nev.: "I have been spending the day going through that stack of mail laid aside to be answered some time and found one from you dated a long time ago. The draft board indicated they would let my boy go through to his Ph.D. but last February picked him up and he is now at the Army Chemical Center in Maryland. I was over to Carlisle, Pa., and spent both Christmas Day and New Year's Day with him. He has his BS in Science from Caltech and his MS in science from M.I.T. and was trying for the Ph.D. at Caltech. Hopes to return

there and continue this time next year. I had hoped that I would be able to stay in Arkansas this winter but the arthritis didn't like the near zero weather we have been having so you see I am back on the Nevada desert again. Fine sunny weather although colder than usual the past three days, which may be due to the perversity of the weather frequently accompanying an attempt to run extensive bomb tests. The only one fired to date was a little fellow too weak to be heard or felt here. The large bombs in the past years have given us quite a thud and have rocked this old hotel in an unmistakable manner. It is a little too early to state that I will be back for commencement this year but the chances are an even bet. If Charles, Jr., remains in Maryland I expect to go to Carlisle to see him at the time of the Dickinson College Commencement and may come up to Boston."

We recently learned that Joe Pope, first vice-president and director of Stone and Webster Engineering Corporation, N.Y.C., has been appointed a director of the Council of the American Society of Mechanical Engineers.

We are sorry to report the deaths of Victor O. Westervelt at Boerne, Texas, Ben Hershey of Yarrow Point, Bellevue, Washington, John Tobin at Tarns, W. Va., and Sir Maurice Denny of Dumbarton, Scotland. We hope your reply to the letter of February 28 from your 50th Anniversary Gift Committee was favorable. It's an easy and rather painless way of raising our 50th Anniversary Gift. As you probably know gifts to the Alumni Fund this year are being matched dollar for dollar by a new mysterious "Mr. Smith." If you haven't already subscribed, won't you do so soon? The next and last dinner meeting of the season will be held at the Institute Faculty Club, Cambridge, Mass., on Wednesday, May 18, 1955 at 6 P.M. Usual reply cards will be mailed, but make your plans now to be with us. Even if you can't come, won't you please return the reply card so we will know that you got the notice? — H. LESTER CARTER, *Secretary*, 14 Roslyn Road, Waban 68, Mass. LINCOLN MAYO, *Treasurer and Assistant Secretary*, 47 Alton Place, Brookline 46, Mass.

• 1911 •

Top o' the mornin' to you all! 'Tis St. Patrick's Day as we compose these class notes — and what a contrast! Earlier this morning we received our copy of the March Review just brimming with 1911 notes (how the man raves!), but right now instead of a feast there is a famine. Generally speaking, you must "Write to Dennie" to get good notes; so before you leave on your summer vacation do just that, will you?

Compliments of Norman DeForest, II, Sara and I had a delicious basket of citrus fruits from his orchards in Maitland, Orange County, Florida, and we recommend to all that if you want real, tree-ripened fruit, packed when picked and dispatched at once, contact Norman at P.O. Box 155, Maitland, Florida. He can fill your order promptly with hard-to-beat citrus fruit.

A. T. Cushing, I, is getting his first les-

lesson on becoming reconciled to having his wife away when the third generation appears. He writes from Kansas City, Mo.: "Grandma has been in Tulsa for more than two weeks. All is well with our daughter and her first child, but Grandma is enjoying this first grandchild of ours so much that she will not promise in her letters when she will want me to drive down and bring her home. Maybe I will have to move to Tulsa!"

It is always nice to have frank letters from classmates, explaining why certain things cannot be done, for many times they show real interest in the project anyway. Acknowledging my class letter emphasizing the importance of subscribing to this year's Alumni Fund, a memorial to Karl Taylor Compton, Charles Magoon, VII, for years with the United States Department of Agriculture in Washington, wrote from 533 West First Street, Mesa, Ariz.: "As long as I was on an earning basis I contributed to the M.I.T. Alumni Fund and was glad to do so. I am now retired and on a limited and fixed income which makes it necessary to sharply curtail contributions to worthy causes. Many, if not most, M.I.T. men have engaged in business with the objective of accumulating money. I have no quarrel with that, but all my professional work has been in the nature of public service, first as a teacher and later as a research scientist, for which, as you know, the compensation is low. It is not that I am averse to honoring Dr. Compton, who richly deserves it. I am glad it is being done and would like to share in the movement, but financial circumstances require that I send you my regrets instead of a pledge." A class agent always likes to have frank letters like this.

I noticed in the Boston papers this morning that President Carl S. Ell, XI, was principal speaker at the annual meeting of the Boston Society of Civil Engineers on the eve of St. Patrick's Day. Carl talked on the subject: "The Viking Countries." Always glad to see '11-ers when they are in Worcester. John Hassett, V, advises that the area office there of the Massachusetts Department of Labor and Industries, with which he is affiliated, has moved from its Main Street address to Room 61, 74 Front Street, right in the heart of the "Heart of the Commonwealth" (Worcester to you). Burgess Darrow, VI, advises that he has moved further out into the suburban area of Akron, now being at 2826 Yellow Creek Road, R.D. 7, Akron 13, Ohio. Similarly, Doc Davis has moved a bit farther away from the heart of Los Angeles, from Corona del Mar to 65 Beacon Bay, Newport Beach, Calif.

With that wonderful "lift" of a \$5,000 subscription from the "Chief," 1911 is right up there again and at this writing we have \$8,564 from 105 subscribers, ranking us fourth in per cent of class subscribing, fourth in total amount and sixth in average amount per contributor among the classes (1916 and earlier) which graduated from Boston Tech, before moving across the Charles to Cambridge in mid-'16. Let's do our best to reach that \$10,000 mark this 1954-55 campaign! — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Framing-

ham, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

• 1912 •

J. Vincent McDonough is now located at 67 Franklin Street, Watertown, and is with the K. J. Quinn Company of Malden, leather finishers and tanners. He has two boys and one girl. The boys are both married. He has three grandchildren. For over 20 years he was with the T. C. Haffenreffer Company, brewers of Pickwick ale in Jamaica Plain.

Taylor Roberts has partially retired and is living in West Yarmouth, Mass. He is engaged in the business of selling building maintenance materials and offering a complete maintenance service to a selected list of clients. His materials are nationally known and are manufactured by the Tiffany Company of Dayton, Ohio. He has secured an office building in Hyannis that is being remodeled and enlarged to offer tenants an unusual service including telephone answering service, stenographic, bookkeeping and mimeographing, all of which are difficult to obtain in that vicinity. Taylor reports the Cape delightful the year round, has fine hunting for quail, pheasant, rabbit, deer, duck and geese in the fall, and fishing, both salt and fresh water during the summer. The winters are very mild due to the nearness to the Gulf Stream. Taylor invites any classmate touring the Cape to drop in on him.

John S. Selfridge, VI, retired as treasurer of the Fireman's Fund Insurance Company, and after selling their house have moved into smaller quarters. He started as assistant to the President with the Home Mutual Savings and Loan Association at 120 Kearney Street, San Francisco. Jesse F. Hakes still carries on as owner and manager of the Baltimore Tool Works but is spending more time on his farm in Glenwood, the suburb where he lives. He has started a commercial nursery where he is starting the propagation and raising of azaleas, rhododendron, yews and other landscape shrubbery. He reports it a fine escape from the small tool business with which he has been associated for so many years.

Rudy Fox, II, writes from Denver that there are no 1912 men in his part of the mountains, although once in a while Randall Cremer's son George occasionally stops in on his way across the country. Rudy is acting as consulting engineer of the Vulcan Iron Works, having disposed of his interest in the plant two years ago. Since this requires but a part of his time he has been building a few rental units in the local suburb and taking occasional trips with his wife. They recently returned from a 5500 mile motor trip East to see their children. His daughter Phyllis has received a doctor's degree from M.I.T. and is now working in New York. His son Denton is working for his doctor's degree at Yale in early Germanic languages.

Fred R. Miller who took some courses in chemistry at M.I.T. with us reports that he retired from his teaching position at English High School in 1942 and is now living in Auburndale, Mass. — FREDERICK J. SHEPARD, JR., *Secretary*, 31

Chestnut Street, Boston 8, Mass. *Assistant Secretaries*: LESTER M. WHITE, 4520 Lewiston Road, Niagara Falls, N. Y. RAYMOND E. WILSON, 8 Ogden Avenue, Swarthmore, Pa.

• 1914 •

Did you see the article in February's *Fortune*, "Douglas and His Peers"? This item credits Don as one of but 20 men in this country who have served throughout the past quarter-century as president or chairman of a manufacturing company ranking among the country's hundred biggest (by 1953 assets). He is ranked with such people as Eugene Grace and Alfred P. Sloan, Jr., but he is second youngest of the group of 20. The article includes the statement, "Technology? Like many of the quarter-century men, Douglas is science-trained (M.I.T. '14)."

A review of the Alumni Association Directory for 1954-1955 reveals the names of a number of our classmates who are currently active in some official way. They include: Alumni Term Member of the Corporation, Ray Dinsmore; Historical Collections Committee of the Association, Chairman Harold Richmond; Class Representative of the Alumni Council, Harold Richmond. Council Representatives of M.I.T. Clubs: Francis Atwood, Tulsa; Chester Corney, Dallas; Ernest Crocker, Bethlehem; Leicester Hamilton, Rochester; Philip Morrill, St. Louis; Arthur Peaslee, Hartford; and Harold Wilkins, Buffalo.

Alumni Representative on Departmental Visiting Committee. Course XVI, Aeronautical Engineering, Charles Chatfield. Officers of M.I.T. Clubs: M.I.T. Club of Cuba, President Pablo Beola; M.I.T. Club of Great Britain, Vice-president, A. E. G. Collins. Honorary Secretaries: Florida, James Bristow; New Jersey, Robert Townsend and Herman Affel; New York, Charles Fiske; Texas, Ralph Goeth. In addition, we have those whose connection with the Institute is more intimate. Harold Richmond is Life Member of the Corporation, and two of our classmates are members of the Faculty. Walter Eberhard is assistant professor of Engineering Graphics, and Leicester Hamilton is professor of Analytical Chemistry as well as executive officer of the Department and secretary of the Faculty. — H. B. RICHMOND, *Secretary*, 275 Massachusetts Avenue, Cambridge 39, Mass. H. A. AFFEL, *Assistant Secretary*, 120 Woodland Avenue, Summit, N. J.

• 1915 •

So you're coming to our Fortieth Reunion, June 10-13. Wonderful! I'll see you there and you'll see 75 other classmates who have signified their intentions of being there to make this one of our biggest and best Reunions. Many are bringing their ladies to the cocktail party, Monday. It's a perfectly delightful place, where you'll enjoy relaxing and visiting with classmates from the nostalgic past. We're not getting any younger! Here's an added attraction you won't want to miss: Bill Brackett, our old Sea Salt, will moor his yacht *Samarkand* at nearby Falmouth Harbor and will take a group for an all-day cruise around the Cape and Vineyard Haven waters. Bring your

sea-legs! Al Sampson and Barbara Thomas are putting on a Class cocktail party, Monday afternoon at four o'clock at The Algonquin Club, Boston, for all classmates and their ladies. This will be an outstanding and gay party and everyone is urged to attend. Whether you go to the Reunion or not, or go to Alumni Day, you are most cordially invited to come to this cocktail party with any and all lady guests. It will be a scintillating finale to our Reunion! Plan to be there. The Transportation Committee will furnish cars for everyone who wants to meet Friday, 12-2 o'clock at 1915 headquarters in M.I.T. (Room number to be announced later) for the drive to the Cape. Also, any classmates flying in to Boston who will notify us of their flight number and time of arrival will be met at the East Boston (Logan) Airport.

Our "Area Key Men" are doing a great job rounding up classmates for the Reunion. Herb Swift and Doug McMurtie have joined this group of hard workers to stir things up in Northern New England. We expect these key men to keep after you fellows relentlessly — come to the Reunion! Ben Neal is heading the "Loot Committee" with Al Sampson and Louie Young, all generous contributors themselves for take-home presents at the Reunion. If any classmate manufactures something suitable for a give-away present to each man at the Reunion, please contact J. B. Neal, Norton Laboratories, Inc., Lockport, New York.

Ed Sullivan wrote on February 9 from Egypt: "Having wonderful trip up the Nile and am now back in the Mediterranean. We have had a fine trip and expect to visit Bierut, Damascus and Jerusalem, Turkey, Greece, Italy, France, Spain and Portugal. Expect to be home May first." Ed will be at Coonamessett to tell us all about the Pyramids and the oriental dancing girls. Clarence W. Hale, President of The Springfield (Mass.) Foundry Company, Springfield, Mass., presided at the observance of his company's 100th year in business in January, 1955. Clarence went with the Foundry Company in 1919. His presentation included the actual operations involved in producing an iron casting. Congratulations, Clarence, and all the best for the next 100 years. A flash back to our big New York City Class dinner at The Chemists Club, January 21, will give you some interesting details. These 38 men attended, 37 were 1915 men and George Rooney's guest. A remarkable showing of Class Spirit. Ben Neal flew in from Buffalo and Phil Alger came from Schenectady to compete for long distance honors: Edmund A. Whiting, Orton P. Camp, Herb Anderson, Hank Marion, Dick Bailey, Fred Cook, Bill Campbell, Henry Sheils, Pete Munn, Wally Pike, Chris Wolfe, Burr Swain, Ray Walcott, Howard King, George Rooney, Lou Hall, (George's guest), Millard Pinkham, M. Warren Cowles, Joe Livermore, Gil Peakes, Al Sampson, Azel Mack, Ben Neal, Frank Parsons, Alton Cook, Sol Schneider, Fred Stetson, Louis Finck, Elmer Waters, Bill Brackett, Alan Dana, Cliff Sifton, Larry Landers, Frank Murphy, John Dalton, Lawrence Bailey, Doug Baker and Phil Alger.

Ken Boynton wired from Asheville, N. C.: "First retirement regret not to be with you tonight. Best wishes for everyone." Wayne Bradley wired from Jewett City, Conn.: "Just couldn't make it tonight will include dinner price with class dues hope to see you in Boston before the Reunion." A delightful letter from Bill Spencer, 213 Cedarcroft Road, Baltimore 12, Md.: "I am enclosing a check to assist in the expenses of the Class of 1915 since I have not contributed anything to you in the past two or three years. I received the notice of the New York dinner next Friday and would have been delighted to come had I not been tied up with a previous date. I hope you all have a delightful time and please give my best regards to all in attendance at the dinner. I am making plans now to take my vacation in the early part of June so that I can be with you at our Fortieth Reunion. All is about the same here in Baltimore. I am still chief engineer with Consolidated Engineering Company and we get our share of the best projects here and in the South as far as building work is concerned. I am trying to reduce my obligations outside of my home and business work. These have involved much work with the Boy Scouts where I was awarded the Silver Beaver, The American Society of Civil Engineers, where I was president of the Maryland Section in 1953 and now represent Maryland Section on District Six Council. I was president of Engineers Club of Baltimore, and have been active in the St. Andrew's Society and a number of others. I hope this finds you and your wife well and prosperous. . . ."

Bridge Casselman writes but has not yet sent his new address: "Sometime soon I shall be living in a new home in Staunton, Va., where, as you may have heard, my employer (American Safety Razor Company) is moving. Process incomplete. My new address is as yet unknown but you shall have it as soon as anyone. I regret extremely that I cannot be on hand for the dinner of old 1915 in New York. And another thing — bring me up to date on my class dues, contributions to Alumni Fund, to Compton Memorial, as I want to keep my status in order. Had a fine Christmas letter from Ray Stringfield. He is keeping busy with his Fullerton Rubber Company and he has a fine family. Regards to you and to old '15."

In preparation for that dinner, Hank Marion, contacted *every man* on our metropolitan New York mailing list. If the man couldn't come to the dinner, he had to give Hank a reason. Hank was persevering, relentless and indomitable (and generous with his contribution of this by telephone expense). Here is a brief report on every man whom Hank contacted. Could you ask for more from any Committeeman? Hat's off to Hank for this job: what a grand guy! Hank's report was titled: "Replies and Conversations with the following:" Jerry Coldwell — Must be in Toronto 20th and 21st. Plans to be at Reunion. Otto Hilbert — In South America. Ed Sterns — "Important engagement," he and his wife. Plans to be at Reunion. Bob Mitchell — Daytona, Florida. Plans to be at Reunion. Louis Zepfler — Retired. Sorry miss this. On trip Florida and California. On 21st at Daytona Beach. Return Cape

May March 15. Ken Boynton — Retired in December. At Biltmore, N. C. "Am sorry to miss the Class Dinner, but hope to see everyone at the Reunion. If you get down this way, don't fail to stop in." Bridge Casselman — Eveready people moved their plant. Bridge did not want to go but is down in North Carolina. Stan Baxter — In Burma. Jim Tobey: In West Palm Beach for winter. Bill Spencer: On committee for big dinner in Baltimore. Sends best regards to all. Harvey Daniels: Just leaving Washington for Florida for balance of winter. Kenneth King: Out on West Coast. Lloyd Chellman: Said he would like to attend but just cannot make it. Hopes to be at Reunion. Ken Roy: In Glen Ridge, N. J. Has had a siege in the hospital. Ray Weaver: Retired. Says he can't get around very well and he does not believe he will be able to attend Reunion. John Little: Must be out of town. Hopes to make it in June. Stan Guthrie: Chestnut Hill, Pa. Just made a settlement with the labor union and has some banquet for the 21st. Reunion too far ahead, but hopes. Pete Masucci: Norwood, Pa. Can't make it, but planning vacation to be at Reunion. Findlay Downs: Allegiance really with Lehigh. Ted Brown: Manchester, Conn., "Sorry Hank, just can't make it." Larry Quirk: Middletown, Conn. County Engineer. Wife says very busy and could not come. Asked that they be remembered to Henry Sheils. Hopes Larry can be at Reunion but he still would be very busy. Charlie Noyes: Haverton, Pa. Sorry not able to attend. L. Walter: Baltimore. Regret will be unable to be present. Gardner Wilson: Mountville, Pa. Will be at Atlantic City Convention. Expects to be at Reunion. Ralph Curtis: West Springfield. Clarence Hale tried to talk him into coming down and might have if Hale had been able to come. Clarence Hale: Longmeadow, Mass. Was coming down but phoned and said something had come up and he just couldn't make it. Charlie Bidwell: Great Barrington. Can't get away. Will be at Reunion. Harold Worthington: Leaving for Florida. Hopes to be at Reunion. Bob Schmucker: Hudson, New York. Doubts if he can make Reunion, been having treatments for several weeks. Elmer Neumann: Albany. Can't get down but plans to be at Reunion. Harold Pickering: Ithaca. Busiest season in heating business. Can't get away, and said he could not make it in June either.

Bill Harbaugh: Allentown, Pa. Just back from hospital. Maurice Brandt: Salisbury, N. C. He writes: "Yesterday I was going to write how nice and warm it was down here, and suggest that next year's midwinter Reunion be held down here in the Sunny South. This morning, however, we woke up to 8 inches of snow. Climate here is going to pot, for five years we have had snow each year. So better make next year's January meeting in Havana. I had hoped to be with you tonight. Better luck next year. Sure, I will definitely be up to our 40th in June. Thanks for including North Carolina in the Metropolitan area. Jet planes sure do make a difference. Best wishes to you all. See you in June."

John Glynn: New Rochelle. Was gassed in war and has had several bad

attacks. The one he had last was the worst. Sounded very discouraged with his condition. Fritz Blomquist: Bronxville. Can't make it, but hopes to be at Reunion. Paolo DeVecchi: Has been ill for over four years. Frank Leslie: Emerson Radio. Says work to midnight. Can't make Reunion. Has too tight a schedule. Vernon Stewart: Wife said they had long-standing engagement which they could not change. She attended her Wellesley Reunion last year and wants her husband to attend ours in June. Clint LaFetra: Ford Instrument. Writes: "Sorry I will not be able to make it." John Duff: Would like to be there and he might if he can switch dates. Phil Keeney: New York. Will not attend dinner or Reunion. Nelson Slater: (Never have been able to locate him). George Lynott: Retired from American Bank Note. At present in Las Vegas, Nevada. In Summer usually in Idaho. Earle McAusland: Regrets cannot attend Dinner. Walter Terrill: No telephone answer. Stanley Osborn: Commissioner of Health, Connecticut. Has General Assembly Meeting Friday. Would like to attend dinner and there is a chance he might be able to at the last minute. Hopes to be at Reunion. George Urquhart: Said he had another engagement. Would like to see the boys at the Reunion but was rather non-committal. Sam Berke: Lakeville, Conn. Just got back from Florida the 20th. Has a lot of engagements for the 21st, the last one being at 5 o'clock, but he said he would very much like to get down there and if it was anything that he could switch or get out of at the last minute he would drive down; otherwise, he will try to get up to a dinner in Boston, if there is one before June, and he plans to be at the Reunion. DeWitt Ramsay: Bridgeport. Has an appointment Friday afternoon but would like to come to New York and he might be able to make it after the appointment. Burnham Field: Niagara Falls With Carbide. Has to be in New York on Monday and did not want to come to New York on Friday and have to come back again on Monday. Very much interested in Reunion. Nelson Stone: Buffalo. Sent a letter and would like to come and maybe would if his closest friend Arthur Bond would go. Expects to be at the Reunion. Ed Walker: Batavia, N. Y. In Florida. Returns in two months. George Easter: Buffalo. Would like to very much but just returned from New York and did not want to go down again. Bill McEwen: Wellsville. If he could sell his wife on it, they might change their plans to visit their daughter in New Jersey and be down for the 21st.

There'll be one more column of notes in June, then we'll see you at the Fortieth Reunion. — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.

• 1916 •

A couple of months ago we reported the death of Marshall Root. Since then we received the following editorial which pays tribute to Marshall and which we feel is worthy of reproduction here: "Hundreds of Woonsocket men and boys from all walks of life and of all creeds will mourn the passing of Marshall J. Root, staunch friend of youth for more

than 30 years. No one person will ever know of all the good deeds that should be credited to Marsh. His reluctance to allow publicity of his beneficences effectively concealed a career dedicated to helping others. More than one successful businessman in this city and in other cities too, owe success to Marsh Root. And more than a few might well have been launched on disastrous careers but for the faith of Marsh in the youth of this city. Long known as 'Mr. Basketball' Marsh devoted most of his spare time to work at the Y.M.C.A. Using basketball and other sports as a medium to attract youngsters, he quietly and effectively worked to build strong characters as well as healthy bodies. And more than one needy youngster was given a chance to attain a higher education through the generosity of the low-voiced man who made this city his home since serving in World War I. Young boys who started careers against society were favorite subjects of Marsh's attention, and not one was ever reminded by his benefactor of time or money spent in his behalf. A gentleman at all times, Marsh instilled in his friends qualities that are evident in many youths and men with whom he had contact. He was an active member of the Y.M.C.A. Board of Directors for many years and an active participant in 'Y' sports until he was well over 60 years old. Marsh Root might well have gone to other cities and greater honors in his professional career, but Woonsocket is fortunate that he chose to remain here. This city and the whole world would be better if there were just a few more men like Marsh."

Here is part of a news clipping found in a Detroit paper: "Dean E. Blythe Stason of the University of Michigan Law School, who has a scientific as well as a legal background, was named Saturday (January 22) as managing director of the Fund for Peaceful Atomic Development. His selection was announced by Walker L. Cislser, president of the fund, a private, nonprofit organization which seeks to exploit the international, nonmilitary aspects of atomic energy . . ."

We were very pleased to receive from Bill Drummey a copy of his book *Madonna and Child* which he recently published. He describes it as "being a private collection by the artist from his Christmas drawings of twenty-five years." It's an outstanding collection.

Here is an account of Steve Brophy put out not so long ago on the back of a flyer from the M.I.T. Club of New York. We found it very interesting and pleasant reading and we think you will. "Somebody decided to take Cinderella to the Ball one day and that's how Thomas D'Arcy Brophy became chief executive of one of the world's largest advertising agencies. Let us explain: Steve started by being born in Butte, Montana, in 1893. Little Gonzaga College in the State of Washington (where he paved the way for Bing Crosby) prepped him for Tech's Class of 1916. Three years in World War I, a stint as an architectural draftsman, and then, his first important job as director of Market Research and Sales Promotion with Anaconda Copper brings us up to 1920. By 1923, he was a vice-

president of Anaconda. In 1929, he went over to Revere Copper and Brass. Revere's advertising at that time was handled by two gentlemen named Otis Kenyon and Henry Eckhardt. They liked Steve's approach to things. And they asked him into K. and E. 1929 saw practically everything turn into pumpkins . . . except T.D'A.B., K. and E., and the advertising business — which metamorphosed into a profession — many thanks to the efforts of Steve Brophy. For Steve felt then, and still feels, that advertising is the Cinderella of American business, that it's looked upon as an expensive, expendable garnishment. He considers advertising 'an essential ingredient to our economy . . . it is to selling what the machine is to production . . . (1) mass produces customers for a mass production economy . . . makes jobs . . . reduces selling costs . . . increases profits.' Of course, some people say that these are just opinions, one man's conclusions. True. But Brophy became chairman of K and E's Board by being able to back up conclusions with convincing facts. (10 percent for the answer . . . 90 percent for the correct equation that got it. Just as at M.I.T.) As it was, Steve exhibited a precocious propensity for chairmanships. At the old Boston Tech in 1916, when it was decided to move to Cambridge and become the Massachusetts Institute of Technology, he was chairman of the Undergraduate Committee in charge of the transfer. Later, at the great Mid-Century Convocation (Winston Churchill invited as one of the speakers) key arrangements in the United States were handled by Chairman Brophy. In between, his work during World War II as chairman of the Information Committee of the National War Fund (including British and American War Relief) earned him an appointment as Honorary Commander of the British Empire — a signal honor for an American and a rarer one for an Irishman. And as President of the American Heritage Foundation, he was largely responsible for the famous Freedom Train, the national non-partisan Register and Vote Campaign of 1952, and this year's Crusade for Freedom. Also, as you members know, he is a past president of the M.I.T. Club of N. Y. Quite a man, this Brophy, wot? Cinderella could want no better escort."

In closing, we repeat again that we're hoping for a good turnout at the 39th reunion which is being held on June 14 and 15 at the Chatham Bars Inn in Chatham, Cape Cod, Mass. If you haven't returned your card, send it in right away indicating that you are coming. Also, while you're at it, we could use more letters with news for our column. There are some who have never written. We sure would like to hear from them. — RALPH A. FLETCHER, *Secretary*, P. O. Box 71, West Chelmsford, Mass. HAROLD F. DODGE, Bell Telephone Laboratories, 463 West Street, New York, N. Y.

• 1917 •

Rudy Beaver sailed in March on the S.S. *Constitution* for Europe, visiting Spain, Portugal, France, Italy, Yugoslavia, Austria, Switzerland, Germany, Ireland and Great Britain. Rudy plans to return home in July via the St. Lawrence and

Montreal. Ken Richmond, Vice-president and treasurer of Abraham and Straus in Brooklyn, was recently named a member of a business advisory council in the New York State Commerce Department to advise on business conditions and problems. Ken is also chairman of the board of the New York State Council of Retail Merchants.

We recently received the news that Frederick W. Dodson, Sr., died on February 19. Fred had been a patent attorney with a N.Y. brokerage firm.

Bob Erb, President of J. F. McElwain Company, Nashua, N.H., has been elected to the board of directors of the National Association of Manufacturers. When Win McNeill attended the Alumni Council meeting in February, he brought with him Joseph Conrad and introduced him to Lobby, Don Severance, Dr. Killian, and others. Mr. Conrad is a graduate of Ohio State, about 35 years old, and has been appointed by the New York Club to handle alumni activities in the New York area. Win was chairman of the committee to get such a man. The Institute is subsidizing Mr. Conrad's employment, together with a secretary and an office. General Leslie R. Groves, Vice-president of Remington Rand at Stamford, Conn., and responsible for research, took an active part in the National Association of Manufacturers Research Committee meeting in New York on February 25.

The experiment initiated this month of sending a birthday reminder to members of the Class has brought forth an enthusiastic response. We hope to continue the practice and thus be able to offer more news in the Review columns. Herewith the contribution of our several guest correspondents this month:

Carl Gilt: "For the past 11 years I have been assistant purchasing agent of the Consolidated Edison Company of New York after many years of engineering work with this company in both station design and transmission and distribution work. In a company of this kind, an engineering background is very valuable in the purchasing work and several members of the department have an engineering background and a few are licensed engineers. In a large and progressive company such as the Edison Company, one is involved in a great deal of interesting work, and during the past years I have taken part in many progressive developments and have seen great changes as well as phenomenal growth. As has been indicated in the public press recently, our company is now definitely planning the construction of a large Atomic Energy Generating Plant for commercial purposes which, I believe, will be the first to be financed by private capital. While I expect to be retired before this is in operation, the initial starting of the engineering and procurement will be very interesting work. While my work is not as directly engineering as it was in the past, I have continued engineering activities in different associations and completed a term as president of the New York State Society of Professional Engineers last year. I have lived in Brooklyn for the past 32 years, and while before I came I felt New York would not be a place of first choice in which to live, I have actually found

that living here has many real advantages. Both of my children are married, though neither my son nor son-in-law have shown any particular interest in engineering and have not followed engineering in their business activities. I now have two grandchildren."

John Holton: "During the past year, my responsibilities have grown, along with the remarkable growth of Carrier Corporation in the amazing air conditioning industry. A year ago when we verticalized our organization along product lines rather than functional lines, I was given the direction of one of the two largest divisions of our company. I am convinced that a sound organization decision was made, and I have thoroughly enjoyed building and developing our Unitary Equipment Division. In some ways, I was not as fortunate as Ken Bell in being able to retire at 60; but I am looking forward to having more time to myself five years from now. This is probably just as well, as I have a son, Robert, who is a sophomore at M.I.T., and a daughter, Nancy, who is a sophomore at Mt. Holyoke. They keep the 'old man' busy and interested in young people and their activities. Of course, six grandchildren also help in this respect. Incidentally, last term Bob had Doc Lewis as his professor in Chemical Engineering; and not only has Doc been most helpful to Bob, but I am particularly pleased that he could have the benefits of the association with such an outstanding builder of boys into men. It is hard to believe that it is 40 years since his father received instructions from Doc. It must have been his association with these youngsters over the years that has kept Doc Lewis so young in spirit. Outside of my working hours, my chief interests center around a delightful summer camp on Lake Skaneateles, with numerous construction projects. Last year, it was building a two-room cottage and sundeck on top of a 12 x 30 ft. boathouse. I have the date already reserved for the 1957 Reunion."

Penn Carroll: "As for history—after 42 years, 6 months, 29 days, 3 hours and 52 minutes, I retired from the Navy in December 1947. Being idle for a year was hard. Then I had the good fortune to be taken on as a member of the faculty of this great Instituto Tecnológico de Monterrey."

Bob Erb: "With the exception of the time during World War I when I was in the Gas Defense Division of the Chemical Warfare Service, I have been in the shoe manufacturing business in New Hampshire. I started out with the W. H. McElwain Company and in 1922 had the wonderful opportunity to be chosen as a member of the original organization of the J. F. McElwain Company. We have been closely associated with Melville Shoe Corporation in New York in the manufacture of their Thom McAn shoes. In fact, in 1939 we were merged into Melville and in 1954 became their manufacturing division. We continue, however, to operate under the name of J. F. McElwain Company. Mr. McElwain is chairman of our Board and I have been president of the Company since 1946. I am vice-president of Melville Shoe Corporation, of the New England Shoe and

Leather Association and of the Nashua Hospital Association. I recently accepted presidency of the Richard D. McDonough Caddie Scholarship Foundation. We are going to try to send some worthy New Hampshire caddies to college. I am a director of J. F. McElwain Company and Melville Shoe Corporation, Pennichuck Water Works, National Association of Manufacturers, National Shoe Manufacturers Association, New England Shoe and Leather Association, New Hampshire Manufacturers Association, New England Council, New Hampshire Blue Cross, Nashua Community Chest and a Trustee of several charitable organizations. So much for business.

"I have a son 21 years old who is at Colby College in Waterville, Maine, and who is a member of the U.S. Marine Reserve group. I have a daughter 18 who is at home. My first wife died very suddenly in 1950 and I remarried in June 1953. I am very happy, enjoy living in New Hampshire, have a small place in Boston where we can stay at such times as we desire to be 'in the city.' I am interested in many New Hampshire community endeavors and have had the opportunity to serve on quite a few national and state advisory committees. I still enjoy golf very much. Have just come back from a Florida vacation and hope to get to Pinehurst during the spring. My golf handicap has gone up from 8 to 15 and Mrs. has gone down from 20 to 5 so the family still has one good golfer. Right now a considerable amount of my time is being taken as chairman of the Technical Committee of the National Shoe Manufacturers Association who represent our industry in negotiations with the United Shoe Machinery Corporation in connection with Judge Wyzanski's decree which followed a ruling that the U.S.M.C. were enjoying monopolistic powers and the Judge decreed that all outstanding leases (and there are over 100,000 of them) must be terminated on a negotiated basis. This is a very interesting assignment although time consuming and at times frustrating."

Arthur Miller: "Ray Stevens says that another venerating birthday puts me in line to say something about myself. Accordingly, here is my story for the past decade. In 1945 I became assistant to the President of the Rohm and Haas Company, manufacturers of synthetic organic chemicals for industrial use. For the succeeding three years my headquarters was Philadelphia and my activities were concerned almost entirely with special problems. After spending six weeks in Europe in early 1948 making a study of the chemical industry there, I returned to the Continent that same summer to remain abroad almost a year. My wife was, of course, with me and we made our home in Zurich. I had business in Germany, France, England and Switzerland and we vacationed in Italy. This was a memorable period in which I had fun struggling to improve my knowledge of German, while my wife did the honors with the French language. I returned from Europe to represent Rohm and Haas in organizing a one dollar a year research division sponsored by the U.S. Army Ordnance Department at Redstone Arsenal, Hunts-

ville, Alabama, to develop new propellants for rockets. This novel experience required about a year and a half. Near the beginning of the Korean crisis, I opened an office in Washington, D.C., for Rohm and Haas and from it, for about three years, I provided the necessary liaison for the Company with the various government agencies. This was a pleasant job but not at all constructive or satisfying. My acceptance to membership in the Cosmos Club turned out to be a boon. I was rewarded for my activity in the Armed Forces Chemical Association by being elected a national vice-president and president of the Washington Chapter.

"About a year ago I came up here to Toronto to take charge temporarily of Rohm and Haas Company of Canada Limited. In the meantime, we have built a small plant for the production of plasticizers, alkyl resins and fungicides. This development has been a rewarding experience. My wife, nee Corinne Parquet of Rochester, New York, has been throughout my varied business career, a stimulating companion. She has struggled with me in the trials and tribulations of innumerable moves and grown with me on account of the wealth of experience which we have enjoyed together. Our one son, who is a veteran (Air Corps Pilot) of both recent wars is now finishing a late education at American University. He is not an engineer but prefers dealing with English literature as his vocation. My health has been good and my whole life thus far a happy and satisfactory experience. Should any of you who read these comments be interested in what made it so prior to 1945, you will find a brief biography in *Who's Who in America*."

Stan Dunning: "There have been no outstanding, newsy occurrences in my activities of the past year but there have been a goodly proportion of compensations. My work as a manufacturers' representative in housewares, selling to wholesalers and the large retailers has gone well. It makes me my own boss and New England is good territory. I certainly meet a great variety of people and that makes it interesting. My outside interests are chiefly with M.I.T. and Old South Church. As Class President the duties are not arduous but always pleasant in arranging for our get-togethers, and now we are turning over thoughts for our 40th Reunion in 1957. Here I have to inject a word to those men who don't 'come around' for one reason or another. If they would take a tip from the increasing few who do turn over a new leaf and come to a '17 meeting, they would have the same reaction, to the effect that they have been missing something and resolve to come and do come to succeeding ones. Being class representative on the Alumni Council is most interesting because of the fellowship and keeping posted on the possibilities for the Alumni Association which operates so efficiently and the really thrilling activities of the Institute. In addition to this, there is the loyalty and affection which always turns up between classmates even though years may have intervened. We are not getting any

younger, and it seems to me that we have now what is almost a heritage that we should make the most of."

Your Secretary is grateful to Win McNeill for the suggestion of a birthday reminder. We hope succeeding issues will receive the enthusiasm and co-operation of this edition. — **RAYMOND STEVENS, Secretary**, 30 Memorial Drive, Cambridge, Mass. **W. I. MCNEILL, Assistant Secretary**, 270 Park Avenue, New York City, N.Y.

• 1918 •

When we were young and life was running at full throttle, remember how we looked forward to the snow; how we made "angels" on the front lawn; rolled the three elements of a snow man, piling one atop the other; threw snow balls at each other? Sliding was the most fun. In Cambridge, the police closed certain streets so we could come down Avon Hill Street on double runners that would hold six or eight shouting boys and girls enjoying the thrill of winter. Of course we had to shovel snow too, but that irritating detail was made quite palatable by the fact that certain neighbors would provide us with pocket money if we cleared their walks. Remember how we listened in amazement to the old folks who hoped it wouldn't snow. How could anyone be so stupid! Then we grew old ourselves in the inevitable way of all flesh. Little did we realize as youngsters the hidden threats in snow. We did not get hurt much when we stepped with undue zeal upon slippery places, neither were our hearts tired by long years of incessant pulsation. Now we know.

On March 3 Henry E. Richards, for 34 years on the faculty of Northeastern University, died at his home of a heart attack brought on by shoveling snow. At the time Mrs. Richards was driving home from Florida, unaware of her husband's death. Besides his Northeastern post, Richards taught at Tufts College from 1942 to 1944. During the summers of 1944 and 1945 he gave courses in electrical engineering at M.I.T. He also was identified with several research activities. From 1918 to 1921, he carried on a research project in turbines for General Electric Company. Henry was a pigeon fancier and raced many of his birds throughout New England. He was a past president of the Northeastern University Faculty Club and recently he was made an honorary member of the Northeastern Alumni Association. He also was a member of many scientific and professional societies, among them Tau Beta Pi, Eta Kappa Nu; American Institute of Electric Engineers, Boston Section, American Society for Engineering Education, Engineering Society of New England, and the Professional Engineering Society of Massachusetts. He leaves his wife and a son, Norman B. of California.

On December 9, Ray W. Harris, who was for a time in Course XV, died suddenly at his home in Belmont, Mass. Although he had been in poor health for some time the family did not anticipate his passing. Our sympathy is extended to members of both families. — **F. ALEXANDER MACGOWN, Secretary**, Jaffrey, N. H.

• 1919 •

Marshall Lee has been appointed sales engineer of the newly created New Britain Box Division of the Paper Products Division of Bird and Son Inc., at New Britain, Conn., and will take up his residence in New Britain. Marshall has been associated with Bird and Son since 1924 and has been packaging engineer for the Fiber Box Division since June 1939. During his residence in East Walpole he has been active in community affairs and in 1941 received the Silver Beaver award for outstanding service in scouting. Earl Stevenson served as chairman of a symposium on patents featured by the Division of Chemical Literature of the American Chemical Society at their meeting in Cincinnati March 29 to April 7 of this year. Brian O'Brien, Director of the University of Rochester Institute of Optics since 1938, who has been on leave since February 1953 to serve as vice-president in charge of research for the American Optical Company at Southbridge, Mass., has resigned from the Rochester faculty to continue his work with American Optical. He will continue to serve on the advisory committee of the Institute of Optics. John Orcutt left in March for his annual pilgrimage to Mexico. Now that he is retired, he devotes most of his time to reading, likes historical novels best. He is also doing a little writing. And visiting his seven grandchildren, he says, fills in his time.

Amos Prescott and his wife have been spending a six-week vacation in Europe. The company with which he is associated, J. L. Prescott Company, has recently acquired the Blue Magic Company of Philadelphia, which will add considerably to their volume of sales. From Ed Moody: "Only two more grandchildren since the triplets. Other than our factory burning to ground and our canvas shelter blowing away in two hurricanes while new buildings was being built—no change." J. Pickering Putnam is still connected with the M.I.T. flight facility at the Bedford airport. The laboratories of the Ludlow Manufacturing and Sales Co. have been moved from Ludlow to Needham, Mass., and Stuart Hayes with them. He now resides at 28 Stratford Road, Norwood, Mass. Stuart has been with this same company for 34 years.

From Webb Patterson's new booklet entitled *100 Dynamic Epigrams*—"The open mind is subservient to reason—and emancipated by imagination." "Kindness is the intelligence of the heart." "The immoral is not the sensual but the mean, the dishonest, and the cruel." — **EUGENE R. SMOLEY, Secretary**, The Lummus Company, 385 Madison Avenue., New York City, N.Y.

• 1920 •

It is with sorrow that I must report the death of Ev Freeman on March 9. Ev had been plant engineer at Brown and Sharpe in Providence for more than 25 years. He lived at 42 Freeman Parkway and is survived by his wife, the former Marion Martin Baker. Ev was formerly president of the Providence Engineering Society and The Technology Club of Rhode Island and a director of the Providence

Lying-In Hospital and the National Ring Traveler Company. He was a member of the Agawam Hunt Club, the Turks Head Club and the Providence Art Club. Ev was a popular and loyal classmate and his loss will be keenly felt by us all.

I need not comment on the Class Reunion prospects because this will be done by letter. All I need to say at this writing is that the indications from our previous mailing have been exceedingly favorable and a successful and well-attended Reunion is assured. The returns indicated that ours is a great Class for travel. Many of those who said they couldn't be with us in June pointed out that they would be in distant parts of the world at that time, some for business reasons, some simply to satisfy their wanderlust. At any rate, your Secretary has gathered quite a lot of information about classmates as a result of these Reunion mailings and will be glad to pass along this information at the Reunion. Among those who notified me of changed addresses are F. A. Brooks who is now in Davis, California, and C. T. Van Dusen who is in Bloomfield Hills, Michigan.

Carl Leander, the noted dentist of Quincy, Mass., has also been active in the civic and religious life of Quincy for many years. He has been a leader and director of the Golden Rule Bible Class of Quincy since 1924 and has been its class teacher for 25 years. Bill Nelson is with A. C. F. Brill Motors Company, Philadelphia. Bill Preston has a new address in Puerto Rico, 514 Sagrado Corazan, Santurce. Phil Rust has moved from Wilmington, Delaware, to Thomasville, Georgia. Bob Sjostrom has left Lawrence, Mass., and is now in Boca Raton, Florida. Edith Swaine has left Staten Island, New York, and is now in Milwaukee, address 805 North 28th Street. Another co-ed, Zelma Zentmire, is in Iowa City. Frank Foley is with the firm of Foley and Lindberg, 209 South La Salle Street, Chicago. Roland Baker is in Phoenix, Arizona. Gerald Mains has a new address, Lucky Hill Road, West Chester, Pennsylvania. Arthur Morley is in Asheville, North Carolina. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

• 1921 •

This month sees the formal dedication of the new architectural unit on Technology's West Campus, — the 1200-seat Kresge Auditorium topped by its three-legged quarter hemispherical roof, contrasting with the nearby "manometer" which is the new cylindrical Chapel, — both adding their challenge to the rectangular form along with the serpentine Baker House on Memorial Drive. When you visit Cambridge for our June 13 Class party or for our thirty-fifth reunion next year, you'll want to see these startling new structures with which the Institute is pioneering in combining modern architecture with highly utilitarian end use. Across Massachusetts Avenue on the East Campus, you'll want to see the start of the Karl Taylor Compton Memorial Laboratories for Nuclear Science and Electronics, which you have helped to create with your contribution to this year's Amity Fund.

Names as well as shapes have new sig-

nificance in this modern age. Hence the change from the hackneyed appellation, "Alumni Fund," to an abbreviation of "Alumni of M.I.T. Yearly Fund," whose initials certainly connote "amity." Lest we forget, during this special year when the entire Amity Fund is being earmarked for the Compton Memorial, there is an extra added attraction for us to contribute larger individual amounts. A modern George Eastman, the anonymous "Mr. Amity," has generously offered as his gift a sum which will match our total giving, dollar for dollar. Also modern, but not in the happy sense, is the current national shortage of an adequate annual crop of technically trained personnel, which we can alleviate to some degree by making a second contribution this year to speed completion of the Compton Memorial. Won't you review the situation now and send another check to Cambridge?

Dr. Williston Wirt, minister of the North Congregational Church of Berkeley, California, has sent us an interesting and most welcome account of his activities, together with a copy of his attractive weekly church publication, "North Star." Reverend Wirt says, in part: "I have been on this assignment since 1949, serving a church that my father founded 62 years ago. My father is an active pastor — the oldest Congregational minister in full charge of a church — and he will be 92 this May. He is still nimble and vigorous in mind. I knew that Bill Hastings of our Class was also in the ministry. I have many contacts with him. In his present job with Church World Service in Europe, he has an important work of relief and reconstruction. I don't know the two other members of our Class who are ministers but I assume that, like me, they felt that 'human engineering' offered a rewarding opportunity, and M.I.T. disciplines were a valuable help.

"For a vocation, I serve as Regional Chaplain in the Civil Air Patrol, supervising the CAP chaplains in this western area. I get to do a lot of flying, which I enjoy. If you read of a mass parachute jump by 15 chaplains last September in Southern California, that was a conference trip. They were enroute to a conference I was heading up in Sacramento. Last summer, I accompanied a group of five Civil Air Patrol cadets on an international exchange trip to Peru for a month. Peru sent five boys to the United States. This international exchange project has grown each year and now involves 24 countries. After my trip to Peru, I felt positive that I had the best assignment of all, for we got to visit the Amazon jungle, the mountain 'lost cities,' as well as the civilized city of Lima.

"We left Chula Vista in Southern California about a year after a polio epidemic hit our community and struck many of our church families and took our own youngest son, who was fifteen. We came back to Berkeley, long our family home, and I have been very happy in this university town, with a view of the San Francisco bay out our front windows. Our other two boys are both teachers; one in biology and the other in mathematics, in schools near by. We have two grandchildren for whom we are always glad to be baby sitters. I know what a terrific

job it is to be a Class Secretary as I am alumni association treasurer for the Pacific School of Religion, my *alma mater* here in Berkeley." Dr. Wirt was a major in the Chaplain Corps of the Army for three years during World War II and had served as minister of the First Congregational Church of Eugene, Ore., before his assignment in Chula Vista.

Functional architecture is not the only index of the changing Institute revealed in the February issue of the M.I.T. *Observer*. An Electronics Laboratory atomic clock, accurate to one part in ten billion and soon to be good to one part in a trillion, is to serve in a time test of Einstein's general theory of relativity. That older model of accuracy, *The Tech*, has started publication of its diamond anniversary volume, anticipating its 75th birthday next year. *Messrs.* St. Laurent, Rose, Skilling, Kurth, Pratt and the many others of the Class who labored with us on Volumes 37 through 40 will please take note! Other references range from radar, guided missiles and high speed aerodynamics to the naming of a new visiting professor of music at Technology.

Louis B. Dennett, manager of Export Sales, Textile Fibers Department of E. I. duPont de Nemours and Company of Wilmington, Del., also sent a fine letter, bringing his record up to date. Lou says he has been with Du Pont in the textile fiber field for 34 years, 14 of which were spent in Buenos Aires with the Du Pont subsidiary, "Ducilo," in Sales Service with rayon and nylon manufacturing plants. He continues: "Returned to the States in 1950 with my wife and daughter. My wife died in 1953. My daughter married a Du Pont chemist in 1954 and recently presented me with a granddaughter. I remarried in November of last year, the widow of an old Du Pont friend who also served in South America. She brings me four fine children, three girls and a boy from eight to fifteen years old. We are now living at 316 North Princeton Avenue, Swarthmore, Pa., but anticipate considerable foreign travel."

Eugene L. Harlin is a partner in the E. L. Harlin Company, contractors of West Plains, Mo. Boris V. Korvin-Kroukovsky has entered the teaching field. Kendall Preston, a retired naval commander, has a new home, "Far Horizons," in Greenville, N. H. Douglas W. Coe is a professor on the staff of the U.S. Naval Academy. Karl Jetter is with the U. S. Operations Mission in Iran. Fred W. Marlow heads his own development organization, Marlow and Company of Los Angeles, Calif. Arthur R. Gatewood was among those given special honors at a New York Section meeting of the American Institute of Electrical Engineers when his citation as a newly-elected Fellow was read. Does anyone have the address of Warren G. Waterman, Jr., who will be remembered as a member of the first *Voo Doo* managing board? Mail is returned from his last known address care of R.F.D., Frankfort, Mich. Have you sent your latest address to the Alumni Register for entry in the new volume now in preparation?

Most of the country's newspapers carried stories in mid-February about the unusual closed TV circuit telecast of an

actual labor-management negotiating session. Several thousand personnel men attending an American Management Association meeting witnessed it during their Chicago convention. Some 40 people associated with Saul Silverstein's Rogers Corporation were invited to the Windy City to put on an hour's unrehearsed program, which was well received when it immediately became apparent to the audience that they were seeing the real thing and not a "rigged" performance. Sumner Hayward, Joe Wenick and your Secretary attended a recent meeting of the M.I.T. Club of Northern New Jersey where the pros and cons of organizing engineers for collective bargaining were discussed by representatives of both sides. The Club celebrates its twentieth anniversary this month. Your Secretary had the pleasure of serving on the original steering committee, which started the organization in 1935, and later served as president of the Club, as did Max Burckett and George Chutter. Joe Wenick has been treasurer for the last couple of years and many others of the Class have had active parts in the development and administration of various activities throughout the years.

This may be the last reminder for you to attend our annual Class party at the Hotel Statler, Boston, from 5 to 7 p.m. on Alumni Day, June 13, prior to the evening banquet. You and your wife are cordially invited. Look for the room number on the hotel bulletin board. — CAROLE A. CLARKE, *Secretary*, Federal Telephone and Radio Company, 100 Kingsland Road, Clifton, N. J.

• 1922 •

Got it down on your calendar if you have not already done so that 1922 will have a pre-Alumni Day Reunion Party on Sunday afternoon, June 12, at the home of Frank Wing, 52 Chiltern Road, Weston. No individual announcements will be sent out and we are relying on each one to write or telephone your Secretary early in June if you plan to be on hand so that Frank can make all the necessary arrangements. Also, all coming to Alumni Day on Monday, June 13, are reminded of our usual pre-banquet get-together at the Statler starting around five o'clock.

Theodore T. Miller, Vice-president for Marketing of Dewey and Almy Chemical Company, spoke to the Controllers' Institute of America in Worcester last January on "How Can Controllers Be Helpful to Marketers?" Ted, as you also know, is heading the Alumni Fund Drive this year with the goal being the Compton Memorial. Ray C. Ellis is vice-president of the Foreign Division of Raytheon Manufacturing Company of Waltham. During the war, Ray served on the War Production Board and the Radio and Radar Division and joined Raytheon in 1945. He has traveled extensively in Russia and Siberia and has had the opportunity of observing the complexities of governmental subsidy of Eastern European industry. This now serves him well in his present position.

The Boston *Herald* of March 21 reports that Crawford H. Greenewalt, President of Du Pont, received the largest salary of the Du Pont officers for 1954 —

\$169,056. He was also awarded a bonus of \$400,000, for an aggregate remuneration of \$569,056.

Members of the Class will be saddened to learn of the death of Ernest F. Stockwell on March 9 at the Beverly Hospital, Massachusetts, where he had been confined for about a month preceding his death. While Ernie was originally of the Class of 1921, he was so well known to many of us that he has often been considered as one of 1922. Ernie is survived by his wife and four sons to whom our sincerest sympathy is extended. — C. YARDLEY CHITTICK, *Secretary*, 41 Tremont Street, Boston, Mass. WHITWORTH FERGUSON, *Assistant Secretary*, 333 Elliott Street, Buffalo 3, N. Y.

• 1923 •

A letter was received from Leslie W. Powers, XV, who is vice-president and Pacific Coast manager of the Buffalo Insurance Company. He is located in Los Angeles and belongs to the M.I.T. Club there. He claims nothing of interest happens, such modesty! We'll find out on our next trip to the City of Angels.

The Boston Sunday *Post*, on January 23, carried an article regarding William Webster, XIII, "Utility Man with a Flair for the Atom." He is executive vice-president of the New England Electric System and president of the Yankee Atomic Electric Company. After graduating from the Naval Academy in 1917 he spent a year and a half with the Pacific Coast Destroyer Fleet. He returned to the graduate school at Annapolis and then transferred to M.I.T. where he received S.B. and S.M. degrees. In 1928 he resigned from the Navy to join the New England Power Association, the predecessor of the present system. In 1950 President Truman appointed him to the post of chairman of the Research and Development Board, Department of Defense, where he followed our late beloved leader, Dr. Karl T. Compton. Bill lives with his wife in Wellesley, Mass., close to the golf course but he finds little time to play. He has one son, a graduate of Princeton, now in government service.

Herbert N. Leisk, I, Vice-president of the International Society of Residential Appraisers, left the natural beauties of Long Island long enough to address a meeting of the Rhode Island Chapter of the Society, held at the Crown Hotel in Providence, R. I., January 19. He has been in the real estate and appraisal field for the past 25 years.

Five members of the Class attended a meeting at the Scarsdale, N. Y. Country Club that led to the formation of the Westchester Chapter of the M.I.T. Club of New York. They were: Richard Kleinberger, VI; I. Robinson, I; C. M. Springer, XV; P. P. Pratt, XV, and your scribe. P. J. Lamoureux, IX, and W. L. Searles, IV, sent in cards but were unable to be present. Approximately 110 Alumni from the area attended the meeting with another 150 expressing interest in joining. Eight activity meetings are planned for each year with certain programs to include speakers from the Institute and lecturers on modern affairs while others will be devoted to fun and frolic (at our age??). — HOWARD F. RUS-

SELL, *Secretary*, Improved Risk Mutuals, 15 No. Broadway, White Plains, N. Y. WENTWORTH T. HOWLAND, *Assistant Secretary*, 1771 Washington Street, Auburndale 66, Mass.

• 1924 •

The big Cleveland Conference in February went over with a bang. From all sides came enthusiastic reports, not to be wondered at since local arrangements were made under the eagle eye of William Henry Robinson, Jr. George Parker happened to be in town at the time and took it in. He found a few other '24 men for company. In addition to Bill there was Doc Way, Floyd Stewart who has left Arma Corporation to be assistant to the president, Jack and Heintz, and Gib Cowan, down from the northern Michigan wilds where he's added a bank presidency to his other jobs. Nothing to be blamed on this meeting, but there was a big wind in Ohio at the same time, and according to George it took the roof off Dave Meeker's plant.

Several new jobs. Probably the most unique is the one Dent Massey has acquired. He's given up selling foreign sports cars for, believe it or not, atomic piles. Probably the world's first piles sales manager. That's his job with American Machine and Foundry. And in the line of exotic work, after all these years in Washington, William Denison Rowe has gone to the Near East as Purchasing Agent for the Iranian government. It's an F.O.A. deal. Bill Rosenwald has taken on a big project. He's this year's General Chairman for the United Jewish Appeal. It's reputed that he gave up several of his other interests in order to do this one.

The traveling Schoolers are back home again at last. After spending some time in Europe and Israel they returned via the Caribbean. In Havana they found Mike Ameza was in New York, but spent a bit of time with Hortensia. In Puerto Rico they were given a guided tour of the University by Professor Calor Mota and of some of the Ferre enterprises by Luis Ferre. "Fabulous," was the Schooler description. Luis is in the government now, although they weren't quite sure of his title. The equivalent of a Congressman, at any rate. Quite unexpectedly they ran across J. Lynch Piland. Now a civilian engineer with the Corps of Engineers, Pi works out of Washington, is living in Falls Church, Va. The Schooler's son Jerry, who was studying at the Institute, entered the Air Force in April, while their son-in-law, Gerald, who many of us have met at Alumni Days past, is returning to Boston to teach at Harvard Medical and be on the staff at Massachusetts General Hospital.

After all those years in the Orient Royce Greatwood is not finding the switch to lemon farming an easy one. "Not as stimulating as running an oil company," he says. However, he thinks Santa Barbara is one of the finest places in the States to which to retire, and he's not spending all his time in the orchard. He spoke to a recent meeting of the Los Angeles M.I.T. Club on the "Economic and Political Situation in the Orient."

A recent show in Washington included a gigantic Hoffmann-La Roche display.

Accompanying photographs show V. P. Cardinal engaged in earnest conversation with Secretary of Commerce Weeks with, of course, the H-LaR display in the immediate background. From Erie, Pa., comes the announcement that Bucyrus-Erie has elected George Y. Anderson Vice-president in charge of engineering, a step-up from manager of engineering. Up in northwestern Massachusetts James Bissland continues to combine engineering with horticulture. He is chief engineer for the Montague Machine Company, but as the "Lanky Yankee" he runs a nursery, spends a lot of time addressing garden clubs.

After 14 years of big city living, Robert O. Dehlendorf finds Dayton a relief. Bob went there as sales manager of A. O. Smith's Electric Motor Division, and his reaction to the city has an almost lyrical quality. "Properly pulsed for peaceful living." That would make a good Chamber of Commerce slogan. Come to think of it, maybe it is! Bob's eldest son is finishing Harvard Business School this year. A Phi Beta Kappa at Amherst, he has just been chosen a Baker Scholar at Harvard, a very high honor indeed. His second son, now at Middlebury, may follow in his father's footsteps and come to M.I.T. later.

People are still shifting around. Here are a few, without much detail. Mrs. Elizabeth M. Pierce is back from India, returning to the peaceful sounding "Apple Acres" in Wilton, N. H. Colonel Charles S. Stodter has been transferred from Washington to the University of Pennsylvania where he's engaged in something called W.E.S.C.O.M. in the Institute of Cooperative Research. Can't keep up with George Tapley. Looks like he's back from Burma. At any rate his mail now goes to Knapp, Tippetts and so forth, in New York, the home office. He'll probably be in Kenya or some such place before this issue appears. Sam Graham has left the islands, but we don't know whether his Sierra Madre address in California is permanent or not. Way we heard it, nobody ever leaves Hawaii.

That's it for now. Oh no it isn't—Frank Shaw will be on my neck if I don't put in a plug for the Alumni Fund. Of course you who read this have already contributed this year, but you will be interested to know that this is far and away the biggest year ever, about \$325,000 by now, almost \$100,000 more than last year's total. 1924 hasn't kept up with that pace. Actually we're far behind last year in amount. So if any of you feel like upping the ante a bit, Frank will turn a few cartwheels in appreciation. — HENRY B. KANE, *Secretary*, Room 1-272, M.I.T., Cambridge 39, Mass.

• 1925 •

The Thirtieth Reunion is but a few days away, but some last-minute arrangements can still be made if circumstances have prevented your notifying the chairman earlier. Even if you cannot make the whole Reunion, you will be welcome at any of the events that you find you can make. Every effort will be made to fit you in at the last moment, but advance information will be most welcome.

The preparation of the new Alumni

Register has brought in many changes of address, too many to attempt to list in *The Review*. During the past month, one of these indicates that Frank M. Corliss, who for a number of years has been the General Electric Representative at Monterrey, Mexico, has, after spending some time in New York City, been assigned by General Electric to Madrid, Spain. In the political field, we find that William F. Fagan, XV, was last fall elected to the Rhode Island General Assembly from the Central Falls District. Bill owns a coal, lumber, oil and insurance business and this is his first elective public office. He has been on the Democratic Town Committee for 18 years and is on the Rhode Island Democratic State Committee.

Among the news clippings comes the information that W. Ernest Stone, XIII, has been named sales manager of the Rice-Barton Corporation of Worcester, Mass. He has been with the company for the past 15 years. News sometimes arrives by devious channels. It was my pleasure to see a note from Morrough P. O'Brien, I, Dean of Engineering at the University of California, on a letterhead of the Republic of Liberia, Department of Public Works and Utilities, Monrovia. This letter was addressed to President Killian and reported the fact that three loyal M.I.T. Alumni, namely Mike O'Brien '25, Henry B. Duncan '28 and Joseph F. Walker '35, had assembled for dinner at Monrovia, having been brought together by an engineering problem of the Port. Duncan being secretary of Public Works and Walker, chief engineer of the Department of Public Works and Utilities in Monrovia. — F. L. FOSTER, *Secretary*, Room 5-105, M.I.T., Cambridge 39, Mass.

• 1926 •

Inevitably when I get to the bottom of the barrel, some kind soul in the Class crashes through and helps keep us in print for another month. This month George Breck's conscience annoyed him to the point where he got out three sheets of paper and gave an account of himself. George starts off, "Don't look now but this is one of the black sheep or lost sheep of the Class writing you. Not that I have any worthwhile news to add to what you publish regularly about the dukes, lords, presidents, chairmen and other notables mentioned in your class notes. But you issue general appeals for news and therefore expose yourself to what the lesser lights send in also." Well, George, the Class of '26 doesn't measure its members by their titles—there were no stuffed shirts 29 years ago and I haven't found one since. We are an exclusive group to the rest of the world, I'll have to admit, but among ourselves, nay—nay. George goes on to say that he changed jobs about a year ago in order to get into more interesting engineering work and it sounds as though he did all right, having joined Eclipse-Pioneer Division of Bendix Aviation at Teterboro, N. J., working on autopilots, servomechanisms, and so on. George says, "You drop away a million cares of the old job that you accumulated and struggled with over the years. At least that's a nice feeling for awhile until you build up the

load in the new location." At a recent dinner meeting of the M.I.T. Club of New York, George met two classmates, Max Lindsay, who is with the American District Telegraph Company (as chief engineer to any non-members of the Class of 1926 who may read this) and Dick Carlisle who is with Dictograph Products of Jamaica, Long Island. Thanks George Breck for setting an example for the rest of the boys.

In writing these notes we are instructed not to use paragraphs, just run everything together, but my severest critic, Ruth, doesn't like the notes that way so I'll save the necessary space by writing a little less. I have a little steam to blow off though before I start conserving space. When a poor peon who has to work for a living in a frigid climate gets a note in mid February from a plutocratic classmate like the following, it's enough to make his hair stand on end. Did I say something earlier about the democratic Class of 1926? Well, I'll take it all back. Just read this missile from that hard-working consulting engineer from Denver, B. V. Howe. "Dear George, We are here on the west coast of Mexico for a vacation. We like the climate here better than anywhere during the winter. 70 degrees F. to 85 degrees F. in the shade and a maximum of 110 degrees F. in the sun. Ocean water 75 degrees F. to 80 degrees F. I towed a 16-foot boat here on a trailer this year. Had a great time fishing. Use a 16 h.p. outboard. Catch eating fish near shore—five pounds to thirty pounds each. Get dolphin, Sierra mackerel, bonitos, wahoos, barracudas, ribbon fish, yellow tails, amber jacks, rooster fish, red snapper and snook. All good fighters. Went 35 miles north on coast in boat for four days, slept on hot sand on beach, cooked our fish and baked sweet spuds in sand. Took 25 gallons gas and sleeping bags. Got to leave here soon and back to work next month. My office is screaming for my return. Am looking forward to our 30th." Now let me ask who among you with the title of president, board chairman, chief engineer and including the rest of us, classed as office boys, wouldn't you swap your title for a couple of months of this kind of punishment every winter? How Ben gets away with it, I'll never know. If I did, I'm sure I'd be alongside sleeping on that hot sand.

Recently the grapevine told me that George Edmonds and his wife are planning a trip to Europe with his two boys, who are at M.I.T., during spring vacations. What's more, the story as I get it is that the boys have told Pop just what kind of art they are interested in seeing in Paris and it ain't in the museums. It sounds to us as though George is going to have an interesting trip—very interesting.

The other day Charlie Rich phoned from his lime plant in northern Vermont about a rubber problem he had encountered. 'Twas nice to hear from him. Upon returning to the office from a business trip recently there was a message that Elton Staples had been in town and had phoned. Mighty sorry to miss Elton. Well that about does it until June, when we hope to see many of you at Alumni Day. — GEORGE WARREN SMITH, *Secre-*

ture, c/o E. I. du Pont de Nemours and Company, Inc. Elastomers Division, 140 Federal Street, Room 325, Boston, Mass.

• 1927 •

Two military promotions have occurred which are of interest. William R. Fredrick, Jr., is now a Brigadier General and can be reached through APO #24 c/o P.M. San Francisco. We last heard from the General in 1953 when he was in Korea. Jim D. Flagg is now a Major and can be reached c/o P.O. Box 663, Florence, Alabama. Arturo Marques' daughter, Maria Teresa, was married in January to Enrique Gasparri Vacca. Don't forget that contributions to the Alumni Fund for 1955 are being doubled by an anonymous donor. All donations will be used for the Karl T. Compton Laboratories. — JOSEPH S. HARRIS, *Secretary*, Shell Oil Company, 50 West 50th Street, New York 20, N. Y.

• 1928 •

The social page of the Boston Sunday *Globe* for February 27 carried a portrait photograph of Franceline A. Cullen with the announcement of her engagement to Eugene A. Leary. Franceline is a "twenty-eight" daughter. Her parents are Mr. and Mrs. James A. Cullen of Winchester, Mass. She has the further distinction of being an M.I.T. senior. Eugene, her fiancé, is the son of Mrs. Eugene A. Leary of Cincinnati, Ohio. He is an M.I.T. man, having graduated from the Institute with the Class of 1954.

George Mangurian, who is chief structural engineer with Northrop Aircraft, delivered a talk at the Institute February 28 on "Structural Fatigue of Military Aircraft." This is the third talk that George has given on this subject. The other two were before the Society of Automotive Engineers and at California Institute of Technology. Within the year he has given a talk also before the Institute of Aeronautical Science on, "Is the Present Structural Factor of Safety Realistic?"

We have sad news in the death of John G. Praetz, Jr. on February 12, 1955. John died in his garage as a result of carbon monoxide fume inhalation. Less than two years ago John attended the reunion at Cambridge with his wife Marguerite and oldest daughter, Linda. He appeared then to be in excellent health, and his untimely death is hard to believe. After graduating with Course II, John worked for the Brown Company, Berlin, N. H., then taught at Wentworth Institute and M.I.T. After a brief career of teaching, he joined the Liquid Carbonic Corporation where by 1946 he had progressed to director of Service and Parts Sales in the Chicago office. Since 1950 he has been with Hot Point, Inc., in Chicago, as Manager-Product Service. John's activities in M.I.T. affairs included membership in the Educational Council, and Treasurer, Secretary, then President of the M.I.T. Club of Chicago. A note has been received from Marguerite Praetz expressing thanks to John's friends in the Class of 1928 for flowers that were sent to her. — GEORGE I. CHATFIELD, *Secretary*, 49 Eton Road, Larchmont, N. Y. WALTER J. SMITH, *Assistant Secretary*, 15 Acorn Park, Cambridge, Mass.

• 1930 •

We are impressed by the number of 1930 women and men who are professors. This month we are pleased to mention Vera Brooks of New Jersey State Teachers College, Louise Hall of Duke University, Melchor Centeno of Venezuela, Royce Kloeffer of Washington, D. C., Joseph Shelley of the University of Utah, Hugh Skilling and John Vennard of Stanford University, and John Weber of the University of Wisconsin. Dr. Charles Lutz is working on the application of atomic energy to industrial purposes in Cleveland. Kenneth Earl has been stationed by the U. S. Navy at St. John's Ravenscourt School in Winnipeg. Bob Quinlan is now located in Albuquerque. Bob Clyne's firm in Chicago is U. S. Industries, Inc. Classmates motoring through New Hampshire this summer are invited to visit Harold Anderson of the Cold Spring Farm Ice Cream Company in Greenland. From Honolulu comes word that Louis Verveer is there now. We have just been notified that Hyman Stein of Albany passed away in February 1954. To his wife and family our sympathy is extended.

As these notes are being prepared on St. Patrick's Day we can report that 24 names have been added to the list of classmates in the April Review who are planning to attend the Twenty-Five Year Reunion or intend to do so if they can: Robert T. Armstrong, Mel Blackwood, E. R. Burling, Ben Buerk, Joe Devorss, Les Engler, George W. Gasset, Louise Hall, Norwood Kenney, Jean Kresser, Sebastian Littauer, Wallie McDowell, Bob Nelson, Jack Osborne, Beverly Ottaway, Dick Phillips, Jack Rogers, J. C. Schroeter, W. E. Slabaugh, Jr., Franklin Temple, Stan Wells, Tom Wigglesworth, Art Wildes, and George Wyman. We have organized a team of "key men" to contact classmates throughout the country concerning reunion attendance and we hope that you will have heard from at least one of them by the time you read this. If by chance you haven't been contacted and do wish to attend the Reunion, please get in touch immediately with George P. Wadsworth, M.I.T. Professor of Mathematics. The dates are Friday, June 10, through Alumni Day, which is Monday, June 13. Do try to include the Alumni Day Luncheon and the Alumni Banquet in your plans. — PARKER H. STARRATT, *Secretary*, 1 Bradley Park Drive, Hingham, Mass. *Assistant Secretaries*: ROBERT M. NELSON, 48 E. Lawrence Road, Phoenix, Ariz. and ROBERT A. POISSON, 150 E. 73rd Street, New York 21, N. Y.

• 1932 •

We finally heard from Bill Holst, who has spent all of his time since leaving Tech with Standard Vacuum Oil Company, and much of this around the world with its far flung activities. Bill is manager of the Economic Coordination Department. He has just returned from Ceylon and India, where he visited Standard Vacuum's new Bombay refinery. Bill now lives at 316 West 79th Street, New York City, with his wife and two daughters. We have heard from Herb Ross too. Herb is section head of the Research Division of United Shoe

Machinery Corporation, working on development of new weapons for Ordnance and the Air Force. The Rosses live at 26 Lakeview Road, Winchester, Mass. Herb's daughter, Mary, is a sophomore at Smith and his son, Bill, enters M.I.T. this next fall. He is one that favors having our 25th, with wives, at some hotel or club near Boston and has suggested the Oyster Harbors Club. John Robertson writes that he thought he was doing well with his six children, four boys and two girls, until he heard from Tim Coffey, who has six boys and three girls! Tim has the class record by a walk as far as I know. John is with United States Gypsum in Chicago and has recently been made associate research director.

Ed Stevens had a very serious operation two years ago. A note from his wife says that he is still convalescing, but gradually returning to normal health. Ed lives at 528 Cochran Street, Sewickley, Pa. He bought the United Oil Company a couple of years ago, which specializes in industrial lubricants. The Stevenses have a daughter at Connecticut College and a second one majoring in piano at Briarcliff Junior College. Jack Strickler is assistant vice-president and executive chief engineer of Bell Aircraft Corporation, living at 96 Morningside Lane, Buffalo, N. Y. Jack joined Bell in 1936, so he is very close to a 20-year-man. As one might expect, Jack is interested in Aero Club activities and has a number of outside interests, including his three children. Bob Watson is chief engineer of the Molded Insulation Company of Philadelphia, one of the pioneers in reinforced fiber glass plastics. Bob lives at Bryn Mawr. He has one boy at Amherst, another going to Brown next year, and his three daughters make up the younger group. Bob reports fascination with antique automobiles, also still sails and participates in amateur theatrics. Like most of us, he reports he is not getting rich, but very happy.

Joe Winkler writes from Rockford, Ill., Box 206, Alpine Road. He is equipment supervisor of Barber-Colman Company, manufacturer of controls. He reports no particular news except for the 15 M.I.T. Alumni men who meet periodically. He is the only 1932 representative. He did visit Kurt Heinicke on a trip to Florida and found that he is already going into the second expansion of his laboratory glassware business. Freeman Fraim hit the current news in connection with the fabrication of artificial nylon arteries. This work had been started by Chemstrand Company, who ran into trouble in braiding the artery satisfactorily, according to 'Chemical and Engineering News.' Freeman pitched in and volunteered to help with an old machine formerly used to braid nylon shoelaces. This machine eliminated the clumsy longitudinal seam that had been holding up development of a good artery, which means a great deal in surgery. Good work Freeman!

One of our Service post grads, Selden Spangler, Rear Admiral and Commander of the Naval Air Development and Material Center at Johnsville, Pa., is having an interesting time. He reports quite a M.I.T. colony there, including his son, Lieutenant (Jg.) USNR, Selden, Jr., M.I.T., '52. Bruce Eaton was there until

a year or so ago and is now with Westinghouse in Baltimore. Selden reports that after three years sea duty, he is very happy to have a wonderful job, which includes all Navy's aeronautical research and development facilities, plus a 200 year old Bucks County farmhouse as quarters. All hands are welcome, with one exception — Army-Navy Game weekend! John King, now retired, lives a few miles away. Vice Admiral Combs is now Commander of Navy Operations for Air. — ROBERT B. SEMPLE, *Secretary*, Box 111, Wyandotte, Mich. *Assistant Secretaries*: WILLIAM H. BARKER, 45 Meredith Drive, Cranston, R.I., ROLF ELIASSEN, Room 1-138, M.I.T., Cambridge 39, Mass.

• 1934 •

Bob Roulston writes from Redlands, Calif., where, as Lieutenant Colonel, U.S.A.F., he is doing a tour of duty. Our thanks to Bob for getting in touch, and here is his letter: "The arrival of this month's Review (February) has spurred two actions. First, to congratulate Hank Backenstoss and, second, to join the ranks of people saying 'hello' to our new Class Secretary and wish you good luck. It's not an easy job when most of our classmates are as poor correspondents as yours truly. I was sorry to miss getting together with you and all the gang at our reunion last summer. Hope to correct it at our 25th. Twenty-fifth — gosh! Those people sure looked ancient in 1934. It has been most interesting and inspiring to read of the many changes and the growth of Tech in both the educational and research fields. But, have plans been started for a second level on which to locate still more future buildings? We've been very happy out here in Redlands for the past couple of years, though we plan to return to New England eventually. I've been assigned to the Office of the Inspector General, U.S. A.F., on inspection of various facets of the Air Force Procurement Program. The attitude of the Air Force toward this work has changed in the last few years from 'snooping' to management inspections such as would be performed by a management consultant for a private concern. We've been on the road a lot, but I've seen a lot of back and front doors of American industry in the process. Of more personal interesting news, we had a second son, Robert Kemp Roulston, Jr., last June 9. He's already giving the old man quite a tussle, for this California sunshine grows big boys. I wish that I could tell you of the activities of other classmates. With all this traveling, I've actually encountered few Tech men in the past months."

We must record the death of Frank Poole on February 28 in Houston where he had been taken one week earlier from his home on Lake Charles, La. He had appeared to be recovering from a heart operation when a sudden attack caused his death. The Class extends its sympathy to his wife and two children.

Francis Buresh has formed a new organization named Buresh Nonwovens, Inc. in Northampton for the purpose of producing fabrics manufactured by the random web process. Francis had invented the machine used in this process while with Curlator Corporation of East

Rochester, N.Y. He retains a connection with Curlator in their sales efforts. — WALTER MCKAY, *Secretary*, Room 33-211, M.I.T., Cambridge, Mass.

• 1936 •

Mostly as a result of the class mailing more news has been pouring in from all sides. Semon E. Knudsen has been appointed general manager of the Detroit diesel engine division of General Motors Corporation, effective March 1. Bud is son of the late William S. Knudsen, General Motors president from 1937 to 1940, and has been manufacturing manager for the aircraft engine operations at the Allison division.

Henry Clyde Johnson announced his marriage to Mrs. Albert Jesse Browning on Friday, February 11, Christ Church Cranbrook, Bloomfield Hills, Mich. George H. Temple, West Springfield, Mass., apparently still believes his M.I.T. education is a good thing. In campaigning as Republican candidate for the Board of Health, George said: "... inasmuch as the function of the three member board is primarily one of administration, his several years of experience in a supervisory engineering capacity lend considerable weight to his qualifications for the candidacy." George has been employed by the Wolverine Equipment Company as sales engineer in this area. He is a registered professional engineer in Massachusetts, and a member of the electrical engineers', American Society of Safety Engineers and has been a resident of West Springfield since 1945. George married the former Lorraine Wood of Brookline and their family now consists of two sons.

Brockway McMillan reports from Murray Hill, N.J. that he is presently a research mathematician with Bell Telephone Laboratories, Inc., in charge of a small group of like-minded fellows who are exploring the applications of mathematics to the arts of communication. Spencer H. Mieras writes in to say that after all these years in Traverse City, Mich., he decided to move on and has recently taken a position as executive vice-president and general manager of Bonney Forge and Tool in Allentown, Pa. Spencer states that he is also a director and that anyone passing through Allentown should drop in. Bob Newman reports from Schenectady that he has recently finished a three-months' venture in Monterrey, Mexico, setting up a T.V. cathode ray tube plant in that Mexican industrial town for International General Electric. This plant will be the first tube factory in Mexico. As Bob says "God bless the poor natives — now they'll have T.V." Wilbur C. Oliver reports from San Jose, Calif., where he is working at the I.B.M. Research and Development Laboratory. He states that one 1936 graduate seemed to be overlooked. He is Luis V. Emilio, 4629 Mataro Drive, San Diego 15, Calif. George Parkhurst writes from Chelmsford, Mass., to say he was sorry to see that someone took the liberty of demoting Bill Creasy from "Major General" to "Major." George remarks that the large number of men located in the Greater Boston area were somewhat of a surprise in view of the few who are able to get to the Boston Luncheon Club and the Alumni Day activities. "As for me,"

he says, "I'm with International Equipment Company in Brighton, Mass." Dean A. Piper writes from Colorado Springs to say he is general manager of Newton Lumber and Manufacturing Company. He goes on to say that they have three lumber yards, a custom millwork plant, and a concrete and light weight aggregate block manufacturing plant. He says Colorado Springs is enjoying lots of national publicity due to it being picked for the location of the Air Force Academy. Business is brisk. Francis S. Peterson writes from Fishkill, N.Y., to say he has been public relations director for the Beacon Laboratories of the Texas Company (Texaco) since 1946. Lawrence G. Peterson says he is still with General Electric Company in Schenectady in the Industrial and Transmitting Tube Department. George D. Ray tells us he is chief preliminary design engineer of the Bell Aircraft Corporation, Buffalo, N.Y. Stephen Richardson of Seattle, Wash., writes in to remind one and all that his firm Young, Richardson, Carleton and Detlie, Seattle architectural firm was awarded one of three of the nation's top prizes in architecture for 1952. The prize was the grand honor award of the American Institute of Architects for the Seattle firm's design of Gaffney's Lake Wilderness resort. Stanley L. Robbins, M.D., tells us he is busily engaged at the present time trying to emulate our old professors. He is teaching at Tufts, Boston University and Harvard Medical Schools, even trying to write a medical text. He says as a result of his work he has found admiration for accomplishments of our faculty. Justin J. Shapiro writes from Silver Spring, Md., to say that the American Instrument Company sent him to the Western Metals Congress in March to deliver an invited paper on the Magne Prove. Albert K. Showalter, says he is a meteorologist in charge of National Weather Analysis Center in Washington, D.C.

Ariel A. Thomas tells us he changed jobs last April, 1954, and is now with Metcalf and Eddy, Consulting Sanitary Engineers, Boston, Mass. Gordon Thomas gives us the good news that as a project manager for the Lummus Company, he returned in December from two weeks at Casper, Wyo., putting the latest new plant on stream and running acceptance tests. This was a \$2,000,000 high pressure Hydroformer for Standard of Indiana's Casper petroleum refinery. Gordon says if he'd had the Class roster at the time, he would have called up Norm Robey there, (Gordon however, hasn't yet told us about the bowling alley he has financed in Lima, Peru! Perhaps Mike Kurlya can check up on it for him!) Fletch Thornton writes to say that Bob Worden knows more about him than he does himself (but Bob, so far hasn't said anything). George S. Trimble, Jr., writes to say that he is still at the Glenn L. Martin Company (17 years now) outside Baltimore, Md. "In the last few years the Company has taken a big turn for the better — ever since George Bunker 31 took over the presidency. Look for big things from us! Last year I was made a Veep which may handicap us some." James L. Vaughan writes from National Research in Cam-

bridge where he is in charge of the process Engineering Division. Since leaving M.I.T., he has traveled the country, working for Standard Oil of New Jersey, Shell Chemical, and Rabin and Haas and has even taught fledgeling chemical engineers for a year at Rhode Island State College. He now has a family of two boys and a girl and lives in Needham, Mass. Halsey A. Weaver writes from Concord, N.H., to say that in December, 1953, his brother and business associate passed away. Since then he has been running his road construction business alone, Weaver Brothers Construction Company, Inc. The Corporation was formed in April, 1946, operating on a small scale, building state highways in the \$50,000 class. Since then they have expanded and tackle jobs up to \$300,000. Captain William S. Whiteside, U. S. Navy, reports that he is now on duty in the Bureau of Ordnance, Washington, D. C. Stanley L. Whittemore tells us he is presently employed (and for the past 18 years) as supervisory accountant, Boston Naval Shipyard. Elwood H. Koontz writes to us from Pittsburgh, Pa., and tells us that Larry Kanter is now in Pittsburgh as a merchandising manager for the Joseph Horne Company Department Stores. Fred W. Meyer is still working hard for Bechtel Corporation, Engineers and Constructors of San Francisco, Los Angeles and New York. He is vice-president and in charge of refinery and chemical plant engineering. He is now married and proud parent of two daughters, Dian 17, and Carol 11. Dana Deveaux writes from Houston, Texas, to say he has spent much time consulting in Texas lately. He even found a 1936 man there, John Graham, who is a consulting marine architect.

Woody Woodman reports from New York that he is still eastern division manager for Lake Tankers Corporation in New York City. Stan Smith writes to say he has been in South Bend for 15 years now at Bendix where he is chief engineer of one of the groups working on aircraft fuel systems and gas turbine controls. He spends part of his spare time in the summer sailing on Lake Michigan, currently trying to push a Tumlaron into the first division of some of the races. Vince Estabrook reports that he is a hard-working investment analyst and counselor with the firm of Standish, Ayer and McKay, Inc. Most of his work concerns the analysis of investments for smaller insurance companies and a number of individual investors. A good part of his work takes him into the offices of the various companies involved so that he has an excellent chance to carry on with the type of studies he started out with in Course XV.

Jack Austin asks members of the Class for volunteers to serve as Class agent in securing contributions for the M.I.T. Alumni Fund. For the last several years this work has been carried on by Bob Gillette in a most competent fashion but it seems high time that someone were to step forward and pick up from here, especially in view of the forthcoming 25th reunion. Will those interested write a letter to our Class President, John C. Austin, 221 North LaSalle Street, Chicago 1, Illinois." The work is interesting

and stimulating, even though there is not much financial reward — HENRY F. LIPPITT, 2ND, Secretary, 30 Rockefeller Plaza, Room 3123, New York 20, N.Y.

• 1939 •

News from the West Coast is that there are about 100 Alumni in the Class of 1939 between Seattle and San Diego and as far east as Reno, Nev. I haven't heard from anybody in Reno lately so I assume that those of our classmates who live there have been on the business end of the one-arm bandits. Here in California I can report some unusual news from some of our classmates. Al Laker and George Cremer are in the waffle business! George's waffles are made of aluminum sheets and weigh eight ounces, whereas Al's are of concrete and weigh 500 tons each. Actually George's waffle is called a metal sandwich and is made of two sheets of aluminum 0.01 inches thick and welded together with a thin aluminum honeycomb. The resulting sandwich is very light, strong, and I believe may revolutionize some airplane construction.

Al's waffle is smooth on top and takes the form of a concrete pad which will be used as the floor of a building in which automobiles will be parked. Al pours a number of thick waffles on the ground and then raises them up and fastens them in mid-air to steel columns, (which have been located in the proper places in advance). Al has conveniently located his waffle iron next door to a large office building in which his gal friend works and thus saves a lot of time at noon when he and said friend lunch together. On the other hand, George is married like some of the rest of us and has located his waffle iron at Solar Aircraft — about 15 miles from his ever-lovin' wife and five youngsters.

I recently had lunch with Tom Blakistone who is president of his own company called Product Associates, Inc. Tom has been working a number of years on electronic-type dictating equipment and has a thorough patent network built up around his products. He is developing a number of interesting applications for remote control of his machines and has some good stories to tell. He would be a good fellow to call for solution of some dictating problems when they arise. At the annual meeting in Los Angeles in January I saw Al Schreiber who is now doing advertising and promotion work with a Los Angeles company engaged in the manufacture and sale of electronic instruments. This is a far cry from Course X; however, I guess that happens to all of us.

I received a letter from Jim Barton who is back at Boeing after a year at Tech as a Sloan Fellow. I would say more about Jim and Mary except in his letter Jim made some derogatory remarks about my making efforts to market a device which makes water taste more like water. Jim seemed to think I should be engaged in making a device which could make water taste more like Coca Cola or Coca, or some other beverage.

In closing I am pleased to report that all is well with the Seykotas. Our apartment is located several blocks from the beach and during January and February

this year, on Saturdays and Sundays, as my boy and I have walked along the beach, relaxing in the sunshine, I have thought of some of the less fortunate brethren who are plowing through snow and sleet in parts of the United States which have a less temperate climate.

With this special note, approved by the local chambers of commerce and all the hundred who have found their way to the West, I close this report. If the other 95 in the West will send me reports I will send them forward for publication and if those of our classmates who are not in the western 100 will read this they may decide to come West and let us make them welcome. — HAROLD R. SEYKOTA '39, Assistant Secretary, c/o R. T. Collier Corporation, 714 W. Olympic Boulevard, Los Angeles 15, Calif.

• 1940 •

By now, most of you have already heard that the reunion is to be held at Snow Inn, Harwichport on Cape Cod, on June 11, 1955. Bob Bittenbender, Chairman of the Reunion Committee attended the Class of 1939 reunion which was held last year at Snow Inn and this preview convinced him that this was the ideal place for our reunion. The tariff is very reasonable, being only \$16.80 per person per day plus \$4.50 registration fee. The entire expense for Saturday and Sunday for you and your wife is \$76.20. There will be ample time to leave Snow Inn on Monday morning, June 13, to attend the Alumni Day Festivities at Tech. Classmates who desire to secure reservations or further information should write to the Reunion Treasurer, John R. Gray at 23 Marshall Road, Natick, Mass. The committee has been hard at work making sure that the reunion will be a memorable one. In addition to Bob and Jack, the other members of the committee are Russ Haden, Vice-chairman, Doug Eckhardt, Secretary, Dick Berry, Wally Schuchard, Phil Stoddard, Marshall Wight, and Dick McPhaul, committee members, and Hap Farrell and John Daufort, *Ex Officio*, committee members.

Kenny Davis is still going up the ladder at the Atomic Energy Commission. He was recently promoted to the position of director of the reactor development from his former position of deputy director. Kenny will have charge of A.E.C. work on atomic energy for airplanes and naval vessels, as well as work on nuclear electric power. Additionally, he will be responsible for A.E.C. programs to encourage private industry and public organizations to take part in the development of devices and processes for atomic electric power. Your Secretary is looking forward to seeing as many as possible of you at the Reunion, at Snow Inn. Don't forget the date, June 11 and 12, 1955. — AL GUTTAGE, General Secretary, Cushman, Darby and Cushman, American Security Building, Washington 5, D.C. MARSHALL D. MCCUEN, Assistant Secretary, Oldsmobile Division, General Motors Corporation, Lansing, Mich.

• 1943 •

Although no letters came this month, I haven't yet lost sight of offering some news to you, though it's an uphill fight.

I sent out 50 cards this week to classmates far and near; 500 more are on their way to see what will appear. If all of you would write to me, I'd win my writing battle; then for a while I could refrain from this poetry and prattle.

These classmates have moved, or are located as follows: Al Brodie, is in Orpington, Kent, England; Ed Bullerjahn has his own firm in New York, known as Bullerjahn-Hegardt; Captain Stephan Carpenter moved from California to Clarksville, Tenn.; Charlie Dale now lives in Park Forrest, Ill.; Gil Edelman moved to Merrick, New York; Dave Halpern moved to Jenkintown, Pa.; Commander Frank Jones, from Charleston, W. Va., now out of Box 28, Navy 100 c/o F.P.O., New York, N.Y.; Barrie MacKenzie is now with Fishery Products, Inc., Cleveland, Ohio; Major Stuart Townshend, Jr., is somewhere in the Pacific with an A.P.O. at San Francisco; John Shutack is now in Hinsdale, Ill.; and that is all. — RICHARD M. FEINGOLD, *Secretary*, 49 Pearl Street, Hartford 3, Conn.

• 1945 •

It is difficult to visualize this dark, dreary day that when you read these notes in early May it will be only a month to our festive, gala 10th Reunion at the Hotel Curtis in Lenox, Mass. To promote interest and renew class spirit a so-called reunion dinner was held at the Faculty Club on March 2 for those Alumni in the greater Boston area. A good time was had by all as old friendships were renewed and the June reunion was discussed in great detail. Those attending were Prexy Chick and Helen-Marie Street, Dave and Janice Flood, Tom and Betsey Hewson, Gerry and May Quinnan, Dave and Mary Trageser, Roger and Ginny Hood, Bill and Elaine Shuman, Don and Jean Wrisley, Frank and Ginny Carroll, Dick and Barbara McManus, Don and Margaret Lovell, Tom and Louise McNamara, Graham and Judy Sterling, Charlie and Nancy Hart, Homer and Mary Eckhardt, Leon and Ree Schindel, Gene and Arlene Rubin, Al and Debbie Cohen, and Don and Joann Whitehead. Also, in attendance, unattached, were George Bermann, Sam DiSavino, Bill Martin and Jep Wade. We don't know about the first two, but we do know that the latter two were out on the town as their wives sat home with the children.

As of March 1, class dues had been received from 108 classmates. To these illustrious members we give thanks for it is wonderful to be solvent again, or should I say for the first time! For those of you that have neglected this necessary burden we ask that you remit if at all possible. As of the same date, completed class record questionnaires had been received from 88 classmates and we hope that many more will be received in order that the class records may be kept up-to-date. Detailed reporting of class record questionnaires will commence next Fall but we thought we would report the following bits of information. Okie O'Connell, of Vitro Engineering Corporation here in New York City, indicates that Red Harrington has been appointed supervisor for the Shell Oil Company in Connecticut. We have an ophthalmologist

in our midst. Carl Howard of Phi Gamma Delta fame opened an office in Miami last November for the practice of ophthalmology which is the proper name for a doctor treating the diseases and performing surgery of the eye. Steve Eppner indicates that he and Evelyn hope to attend the reunion if their first offspring arrives ahead of schedule. After Navy separation in January, 1954, Steve decided against returning to the television manufacturing business and joined Emenee Industries here in New York, a young organization manufacturing toy musical instruments. Among other things one of Steve's duties is that of purchasing agent which is a far cry from electrical engineering.

As of now, March 6, the following indicate that they will be in attendance at the Curtis, June 10-12: Pete and Lou Hickey, Leon and Bee Schindel, Romeo and Irene Faureau, Marshall and Dorothy Byer, Chris and Jean Boland, John Gaffney, Jerry and Lib Patterson, Jumper and Marion Gammon, Dan and Ruth Vershbow, Jim and Ellen Brayton, Chick and Helen-Marie Street, Walt and Margot Borden, Guy and Mrs. Gilleland, Frank and Alice Donohue, Dave and Mary Trageser, Ed and Elinor Stoltz, Okie and Lou O'Connell, George B. Hetrick, Bill and Jean Martin, Bob and Carol Welch, Bill Meade, Dick and Barbara McManus, Bob and Anne Maglathlin, Ray and Jeanne Pelley, Clint and Fran Springer, Tom Stephenson, Warren Miller, John and Lorraine Thompson, Bill and Betty McKay, Chuck and Janet Patterson, Frank and Ginny Carroll, Max and Trudie Ruehrmund, Bill and Elaine Shuman, Jep and Emily Wade. As indicated above Steve and Evelyn Eppner hope to attend as well as the following: Don and Roberta Ostrower, Selma C. Swift (Teichmann), George and Mary Jo Dvorak, Julian and Lois Busby, Dan and Eleanor Meckley, Russ Hamon, Bill and Elaine Duffey, Jack and Janet Leonard, Dr. Ray and Marlene Bradford, Phil and Jasmine Pocock. Pam Elmendorf indicated that she and Ray would be on hand if Ray returns from Iran before June 10. To those of you that are awaiting an attendance list, we know that several of those listed above will be classmates you are anxious to see. Why don't you promptly send in your reunion data in order that they may see you. Frank Donohue asked that we have a clambake. Let us say that we do intend to have a cookout on Sunday and that the entire reunion weekend will certainly be a clambake (although we may not have clams). Don't forget 1945's 10th Reunion, Hotel Curtis, Lenox, Mass., the weekend of June 10-12. We hope to see you there. — CLINTON H. SPRINGER, *Secretary*, Fireman's Mutual Insurance Company, Room 2140, Graybar Building, 540 Lexington Avenue, New York 17, N.Y.

• 1947 •

For the vast majority of you who have breathlessly awaited my pronouncements for the last two issues of The Review, I must offer abject apologies. I've been away from Boston too much lately, and am unable to borrow a typewriter anywhere else, so that my solemn duties as Class Secretary could not be discharged. I was in Princeton at the March deadline,

and Flushing for the April deadline. But here it is May, and I find it has been so long since I've reported any news that I must go all the way back to Christmas to catch up. One thing seems certain, anyway. You'll have a lot of reading to do before finishing this column. So, enough about myself (not really, but we must be modest), and more about others.

A note from Ed and Trudi Dytko, came with their Christmas card. They are now living in Oak Ridge where Ed is a project engineer with Pratt and Whitney. "We are quite settled now, and ready for visitors — how about a quick trip down? Would love to see you — really miss your cheerful visits in Norwood and our excursions into Beacon Street for a few martinis." Also in the Christmas mail was a note from Bob and Jen Warner: "How's the 'banana-boat kid'? Seriously, we envied you. Both Jen and I love life on a boat, and your vacation caused a round of mouth watering. We just finished a vacation ourselves, devoted to painting the kitchen and to anyone who happened to drop in unannounced (be sure to knock if you happen by). We've just bought (via the usual F.H.A.) a three-bedroom, ranch-style beauty, the only drawback of which is that yours truly has to mow the lawn. The house is seven years old, and has borne its years well. However, it is only just beginning to suffer. The lot contains (primarily) a complete sprinkler system, also a few trees and some flowers. You should have seen the Garden-of-Eden description in the ad we saw. In general we're delighted. Work is terrific. Really, you ought to give California a try. Not Smogville, of course, but Ames. Besides Northern California needs tennis players. We can't find any competition. Be sure to say hello when you're on the Sunny side of the Rockies." Bob is with the National Advisory Committee for Aeronautics at Ames, and is apparently sold on the West Coast.

Shortly after New Year's I drove down to Newport to spend a Sunday with Carroll and Hazel Andrews. Andy had just been discharged from the Navy after 11 years as an electronics officer, and they were preparing to leave Newport for Poughkeepsie where Andy has accepted a position with I.B.M. Hazel was expecting their second child. Debra Sue is two. I haven't received word as yet as to whether it's a boy or girl.

Starting in the middle of January I was away on business for six weeks. I went down to Princeton for a week and a half with Dan Fink'48, who has recently been promoted to chief project engineer with Allied Research Associates, Inc., where I draw my check. To any of you who live in the fair community of Princeton, my regrets for not dropping by in my repertorial capacity, but the bar at the Nassau Tavern Hotel is such a friendly place. From Princeton, I made my way to Flushing, where I sojourned for four-and-a-half weeks. This gave me a wonderful opportunity to visit all the old friends in the New York area, whom I haven't seen for so long.

Dick and Doris Scheuing entertained me at their home in Lynbrook, L.I., one Saturday evening. Dick remains with Grumman Aircraft, where he is in a

senior position in the aerodynamics research group. Also Long Island residents are Hugh and Lorry Flomenhoft who live in Massapequa Park. Hugh is with the McLean Development Laboratories as a structures engineer. I visited them at their new home one evening, arriving an hour late for dinner, through one of those awful misunderstandings. Fortunately, their two-year-old, Debbie, was still up and she is perfectly charming.

Marty Starr lives in Greenwich Village in one of those little apartments you read about. We martinied there one evening before repairing to a local restaurant for *shish kebab*. It occurs to me as I write this that I don't recall where Marty is working. Those martinis must have been strong. I do remember, however, that Marty is officially listed with the Class of '48, but expressed the deep desire to reaffiliate with '47; and I promised to mention his name in these notes as a sort of a launching. Unfortunately my trip to New York ended before I had anticipated it would, and I had to cancel my visit to another ex-'47 man, Bob Podell '49, who is associated with International Telephone and Telegraph in New Jersey. I spoke to Bob and his wife, Helen, several times, however, by telephone.

There was a note from Paul Moschella waiting in my mail box when I returned. He writes: "I have been out of contact with the Class for quite some time — would certainly appreciate your conveying to our classmates the following information. I am married to the former Jeanne Bonnette of Hartford, Conn., and have a son, Jeffrey Paul. We are now living in Ellington, Conn. I was recently advanced to the head of the Industrial Engineering Department at Hamilton Standard, Division of United Aircraft, Windsor Locks, Conn." Hrand Saxenian is an assistant professor at the Harvard Graduate School of Business Administration. Henry Bourne has been appointed assistant professor of Electrical Engineering at the Berkeley campus of the University of California, where he is both lecturing in the basic courses and instructing in the laboratory. Arnold Judson, who is assistant personnel manager for the Polaroid Corporation, has also entered into pedagogical matters. He is teaching a course titled, "Techniques of Personnel Selection" for the Division of University Extension of the Massachusetts Department of Education.

The American Concrete Institute has announced the appointment of Paul Rice as their Technical Director. Prior to this appointment Paul was, for five years, a structural field engineer for the Michigan District of the Portland Cement Association. A new housing development in Lexington, Peacock Farms, is being developed by the architectural firm of Compton and Pierce, the senior partner of which is Dan Compton. An article in the Boston Sunday *Herald* describes the new planned community in glowing terms. — CLAUDE W. BRENNER, *Secretary*, 1470 Beacon Street, Brookline 46, Mass.

• 1948 •

Whitfield Mauzy was married in February to Abigail Macomber, a '49 Smith graduate, and they are now making their

home in Maracaibo, Venezuela. Bob Abelson, who is now an assistant professor of psychology at Yale University, will be wed in June to Willa Dinwoodie of Cleveland, Ohio. The bride, at last report, was attending graduate school at Radcliffe College working toward her Ph.D. in clinical psychology. Charles Deane was betrothed (at least that's the word the newspapers used) to Elizabeth Brown and is now making his home in Brookline. And away back in November 1954, Bill Smith was married to Jane Marie Morgan. Bill is a microwave development engineer with the Raytheon Manufacturing Company and his bride is affiliated with the nursing staff at Massachusetts General Hospital.

On February 12, a second child and first daughter was born to Mr. and Mrs. George Hossfeld; but we have no further information in this department.

From the Army Chemical Center near Baltimore, Md., we have received word that Private David Doonan has returned there as chemical engineer in the Chemical and Radiological Laboratories. He worked there five years as a civilian before entering the service in June 1954. At the annual meeting of the American Institute of Chemical Engineers held in New York last December, Lewis Etherington '49 an Eastman Fellow in our Class and now affiliated with the Standard Oil Development Company in Linden, N. J., presented a paper on "Adsorption Phase Equilibrium Correlations." George Collins is a meteorology engineer with the Du Pont Company and only recently finished teaching an extension course at the University of Delaware in "Introduction to Weather Study." In February John Kaweck was awarded a master's degree of Business Administration by Western Reserve University in Cleveland; and at about the same time Thomas Kelly began an 18 months' course at the Harvard Business School leading to a master's degree. Tom is married to the former Margaret McCormick of Detroit and has two children.

Turning to the industrial news: Ken Brock has been released from the Army and is now the sales and advertising manager of Browning Laboratories in Winchester, Mass. Ken will be responsible for sales of the company's high-fidelity tuners and electronic instruments. Charles Dolan, now a sales representative of the Johns-Manville Industrial Products Division, has recently completed an advanced training program sponsored by Johns-Manville in modern sales techniques. Bob Weinerman, a '48 graduate student, is vice-president and secretary of the Southern New England Contracting Company, which has built many civic structures in and around Hartford, Conn. Bob joined the firm, headed by his father, in this capacity upon leaving Tech. Morton Braun is a field representative for the Urban Renewal Administration, an agency of the federal government.

Bob Mueller, who studied to be an engineer in ole 1948, has turned to painting and had his first one man show in New York City in January. The critics who covered the event commented on Bob's work as follows: "involved with the interplay of mechanistic and plastic con-

ceptions, abstractions alternately gloomy and baroquely rich in color. The image and its meaning seems to be the main preoccupation. . . ."

We'll see you in the next month or two; If we have news. WILLIAM R. ZIMMERMAN, *Secretary*, 4510 Leshar Drive, Dayton 9, Ohio. RICHARD H. HARRIS, *Assistant Secretary*, 26 South Street, Grafton, Mass.

• 1950 •

All roads lead to Coonamessett on Cape Cod. Send in your reservation now for the Reunion Weekend on June 11-12. A glance at the tentative roster of people who are planning to attend reads like a who's who of the Class of 1950. A rundown of some of those planning to attend include Karl Ahlstrand, Alex Bloch, Don Bly, Pete Baker, Norm Champ, Charles Chittick, Jim Cass, J. J. Earshen, Ed Friedman, Al Hickley, Dave Gushee, Emile Harp, Bill Hall, Ralph Gretter, Joe Gottlieb, Sal Marshal, Wm. Martz, John Kern, Jack Mohr, Herb Sontag and some 60-odd more, as of the middle of March. And the list is growing all the time. The latest publicity release of the committee lists all the do's and don'ts of reunions, along with a more comprehensive listing of people attending. It's one show you can't afford not to attend. Fun and merriment will be the order for the day.

At a double ring ceremony in Columbia Congregational Church in Connecticut last October Viola Postemsky and Frederick Cordner exchanged vows and after a trip to Bermuda, set up housekeeping in Columbia, Conn. Fred is employed at the research department of United Aircraft. Last September Elizabeth Damon and John Gutai were wed in Weston, Mass.

News from Al Gallucci of Bridgeport tells of his marriage to Holly Riccio of Fairfield, Conn., in November. They visited Florida on their wedding trip and then back to Connecticut where Al is at present very busy as president of the Grasso Construction Company in Shelton. The activity of his company consists of processing sand and gravel and mixing asphaltic paving materials. His processing plant in Beacon Falls is one of the finest and most modern in design in New England. He extends a hearty welcome to anyone interested in visiting his plant. At present he is supplying aggregate for the new multi-million dollar plant in Stratford, which United Aircraft Sikorsky Division is erecting.

It was old homework last September when Jack Jacoby and Katherine Owen became Mr. and Mrs. at the Christ Church in Cambridge. Jack's brother, Dean, was best man and Technites included in the wedding party included Mark Baxter, Joe Fleming, John Kern and Gerald Fisch. Jack is with the Olin Mathieson Chemical Company in New Haven, Conn., and they both are planning to spend a pleasant weekend at Coonamessett this June. Ted Metzger and Joyce Joan Crandall were wed last July at the Anabel Taylor Chapel at Cornell University. Also joining in the wedding parade are Mr. and Mrs. Robert Merrill (she was the former Dorothy Costello of Arlington, Mass.), and Mr. and Mrs. Stuart Shaw, she being the former Catherine Miller.

Jim McAllister comes forth with the following report from St. Louis. "The following boys have been coming to the St. Louis M.I.T. Club meetings: Barney Byrne, Norman Champ, and Clarence Picard. Bud Picard recently started to work for McDonnell Aircraft Corporation, and I happened to run into him in the cafeteria there a day or so after. As you might guess, I work at McDonnell, too. Bud is in the Contracts Division, and I am in the Electric Laboratory of the Aircraft Engineering Division. I spent about two years in the Antenna Laboratory and recently I have been given a group on Instrumentation Research. The work is all very interesting, the breaks have been pretty good and I have been happy at M.A.C. ever since I left Tech. I am still a single character and I have been practically married to a Boy Scout Troop for three years. I guess I'm one of the few left. Two of my old roommates, Buck Nippe and Larry Poudrier both are married. Buck is now teaching Math and studying for a Sc.D. at Boulder, Colo. Larry is working at Douglas Aircraft in Long Beach, Calif." A birth announcement from Norm Champ tells of the arrival of Deborah Anne Champ on August 5, 1954. Normy is working as a shop foreman for Midwest Piping Company, Inc. in St. Louis, Mo.

Don Smith has been named an applications engineer for communications equipment at the Raytheon Manufacturing Company. He will be responsible for analyzing incoming data pertaining to prospective installations of the new TCR-12 "Telelink" relay system, a microwave device used for voice telemetering and telegraph communications. The Smiths and their two children are living in Waltham, Mass.

Harry Foden has joined the staff of Arthur D. Little, Inc., and he will be working with A.D.L.'s Process Engineering Group. Jim Jensen also has joined the ever-growing group of fiftyites at A. D. Little. Jim will be working on problems in petroleum. After graduation, Gordon Sargent was with Colgate-Palmolive-Peet Company until his Uncle Sam called and he was made a second lieutenant in the army as a research and development officer at Picatinny Arsenal. After discharge, he joined Linde Air Products Company, where he was a semi-works engineer in their silicone department. Last fall, Gordon joined the staff of the Hooker Electro-Chemical Company at their Niagara Falls plant, where he is engaged in the process study group. James H. Kennedy, III, resigned as managing editor of "Textile World," a McGraw Hill publication, to accept a position as senior associate and administrative assistant with the management consulting firm of Bruce Payne and Associates, Inc.

A note from Dick Ahern says the following: "I am teaching architecture as assistant professor at Kent State University in Kent, Ohio. The return to academic life is re-invigorating. Kent has over 5,000 students and the school of architecture about 125 students. On the side, I just got my first big break, insofar as architectural design is concerned. I am to design 'the most modern house possible' in Jamaica, B.W.I., and spent a week during

January down in Jamaica looking over the site."

The Weavers are now living in the suburbs. We bought a house in Bedford and all those interested in dropping us a line about yourselves, kindly note the new address. Be seeing you at the reunion. — JOHN T. WEAVER, *Secretary*, 24 Notre Dame Road, Bedford, Mass.

• 1951 •

It's time again for another informal chat to give you a few news items. Soooo — let's dig into the mail bag and see what has been happening. Here is a letter from Don Galinat: "My wife (Mary O'Reilly of Ray Bolger's Technology Sweethearts), two boys and I have recently returned to New England. I am now working with the American Optical Company in Southbridge, Mass., and continuing with development work on optical applications for plastic lenses. I am also spending considerable time on the development of plastic viewing screens for Todd-AO system of movie projection. I shall be looking forward to meeting old classmates at the Fifth Year Reunion." Thanks, Don, it was good to hear that the boys are beginning to beat the drums so that all 1951 men will answer the reunion call.

Next, we have a very interesting letter "Sixth Annual Report of the Tanguay and Tanguay, Inc., Company." A few quotes are included: "Our latest dividend Charles Kirby Tanguay arrived on November 21." Army reports that Chuckie now scales 10 lbs. and 5 ounces. "Accomplishments this year include a large successful garden, a full fruit cellar (including peaches, purple plums, tomatoes, and assorted jams and jellies), four shade trees (one 25 ft. dug out and in by the senior officers), our first two fruit trees (gifts of good friends), a large "office upstairs" for the 2nd Vice-president (Armand, Jr.) completed with no outside assistance, all interspersed with several out-of-town trips by the President." Thanks, Army, best wishes for a prosperous future for your corporation!

Marty Miller took a few minutes away from his case studies at the B school to jot: "After M.I.T. I spent two excellent years in the Air Force stationed at Wright Field with Ralph Romano and the boys. I purchased items for the Aircraft Laboratory and had opportunity to travel all over the country. I made a trip to England to study the British method of handling Research and Development Procurement. After my discharge I came to the Harvard Business School. There are many Tech men here but Ernie Jensen seems to be the only '51 in my class. Tom Kelly and Bill Hoffman have started the Mid-Management Program here. We had a large gathering here Saturday night: Jerry Elkind, who is now completing his doctorate studies at Tech and Richard Straus, who just started with A. D. Little found their way to this place for a get-together, I understand Fred Bumpus is with an insurance firm in Boston. In June I expect to start working in the hat business." Marty, quite a few hats are worn in this neck of the woods! "Incidentally, Fred Weitz is now handling the old job I had at Wright-Patterson." Good-luck to the "Adam" hat business, Marty!

Sandy Sussman gave your Secretary a

pleasant surprise with his informative letter: I am now a sales engineer doing technical sales as a manufacturers' representative in the electronics industry in the N.Y. area. Jim Michelman is still single and now is working at 34th Street for Macy's in their merchandising training program. Larry Schneck is a hydraulics engineer with Sperry Gyroscope. At last report he was still single. Steve Eisen is a Group Insurance representative for the Equitable Life Insurance Company. Ed Margulies'52, now a med student at Cornell Medical Center is in this area. Dick Moroney is an F-86 pilot stationed in Las Vegas as a gunnery instructor. I guess you heard that Dick received the D.F.C. while flying as wingman for the top jet ace Pete Fernandez in Korea. Herb Gevirman is still single and a G.I. normally stationed at Ft. Monmouth but at present on a four months assignment on the West Coast. Charlie Kurz is a mechanical engineer for MacLean Development Laboratories in Copague, L.I. Marv Frank, married — with one child and one on the way — is doing sales and engineering for Freman Electronics in Westbury, L.I. Joe Sangiolo is working as an engineer for General Precision Laboratories in Pleasantville, N.Y. Tom Weil — living in Wellesley Hills while his wife completes her studies — works for Raytheon as does Howard Cole who lives with Nancy and the children in the Boston area."

Other news: Bob Richard, Jr. joined the staff of the Du Pont Company's Yerkes Research Laboratory as a research engineer — this lab is located in Buffalo. Ralph Bowman is working for Standard Vacuum Refining Co. in New York City in the Refining Coordination Department, employed as a process engineer. Jerome Kirk took part in a showing covering the work of five artists at the Bon Bazar in New York City; his work featured fish-mobiles. Jerry has been a prize winner at the Detroit Museum.

The February issue of *Fortune* magazine carried an article called "Depression Babies." The article gave a picture of six young graduates of various colleges, giving a brief outline of their education and present occupation of each, purporting to show that babies born during the depression, or young men now 25 years of age, are doing well in their chosen fields. Dick Foster, Course I, was one of six men interviewed. After serving two years as a lieutenant in the USAF, he is now employed in construction work in Omaha, Nebraska. John Ishikawa, formerly a chemical engineer in the research division of the Polychemicals Department (Du Pont) was transferred to the Pigments Department laboratory at Newport, Del. Gene Lubrasky is in the research and development phase of Socony-Vacuum Oil Co. at Paulsboro, N.J. Nathan Kirschbaum is helping the plane business with work with the Boeing Company at Seattle. The department of bacteriology has the services of George Bornside at the University of Iowa. Frank Packer is with the Bureau of Ships, Washington, D.C. Don O'Brien finds work stimulating at the Midwestern Geophysical Laboratory in Tulsa, Okla. Paul Murphy is working for the New York

Central railroad in Indianapolis, Ind. Ed Mason is with the department of chemistry at Penn. State. The Schermerhorn Oil Corporation is utilizing the services of Henry Sherman. Ed Richards is with the United States Steel Corporation at Pittsburgh while Bob Marsh concerns himself with work at the Hughes Aircraft Company, Tucson, Ariz. Ed Fitzgerald is in the engineering department of Du Pont, Wilmington, Del. Roger Crane is working for the Westinghouse Air Brake Company at Pittsburgh. Dave Caplan is at the Burroughs Research Center, Paoli, Pa. Bob Donovan likes New England and he works for the United Shoe Machinery Company at Beverly, Mass. in their research division. Harry Dreicer is very busy at Los Alamos, New Mex. Tom Maddock is connected with the Public Works Department at Santa Anna, Calif. Bill Spicer can be reached c/o physics department of the University of Missouri. Ray Sangster is working at the Texas Instruments, Inc., in Dallas, Texas. That covers the news items, men (and women). Write a few lines to your news-hungry Secretary. —STAN MARCEWICZ, *Secretary*, c/o The Lorraine, Route 2, Highland, N.Y.

• 1953 •

During the past few months in Korea I have recognized certain deficiencies in my method of acquiring information for the class notes — namely that there are far too many of you for me to try to do an effective job on contacting each of you personally (other than by succumbing to an impersonal type of “filling in the blanks” form). The best bet toward maintaining the element of personal contact (which is the source of virility for the class notes) seems to be the application of Adam Smith’s idea on division of labor. In short, I’d like to divide the Class into geographical blocks and possibly by course also. If those of you who would enjoy collecting information from class members either in your geographical area or in your Class will contact me, I’ll provide you with appropriate names and addresses and keep you up to date on any changes. I’ll be back in the States by the time that you read this so send your letters to my home address. John Henry and Anne Dacey were married in Milton, Mass. on September 4. John spent three years in the Air Force, and, after their wedding trip to Florida, John returned to his position at the Draper Corporation in Hopedale, Mass. Those of you in Course I and XVII remember Sieg Wolf. Well, in addition to acquiring his master’s degree he also married Judith L. Hirsh of Chestnut Hill. Judith graduated from Wellesley in 1954. After a trip through the United States and Canada, Sieg and Judith settled in Buffalo, N.Y. There were two weddings on Saturday, September 4. Jim Fenske and Faith Allen Weden were married in Auburndale, Mass. Jim planned to continue with some graduate work after he and Faith had seen parts of Maine, Canada and Michigan. On that same Saturday Ronald Sporing and Lillian V. Sheehan were married in Duxbury, Mass. Lillian is a graduate of Mansfield Academy in Boston. Ronald is serving with the Air Force.

I have a few notes on our only August marriage. Lieutenant Joseph Banks and Virginia Howley were married in Worcester, Mass. Unfortunately I don’t have a picture of Virginia, her graduation from the Moderne Venue Academic School of Modeling arouses my curiosity. Joe evidently planned on some state-side duty with the Air Force since he and Virginia live in Arlington, Va. Gene and Marianne McKenney were married last September in Roslindale, Mass. Marianne attended Boston State Teachers’ College and Northeastern University. Gene is presently completing his graduate work at Tech.

During the months of October and November two of our classmates made the march to the altar. Peter Balas and Constance Kresser were married in West Roxbury, Mass. Mrs. Balas graduated from the Massachusetts School of Art, and Peter graduated from Sampson college prior to his graduation from M.I.T. Peter and Constance planned to live in New York City after a trip to Nantucket. Walt Dietz and Nancy Foxon were married in November in Malden, Mass. Nancy is a graduate of Boston University.

A couple of notes on some fellow Army officers: Lieutenant John Meader was assigned to the Plants Division of the Chemical and Radiological laboratories at Fort Monmouth. John received his master’s degree from Tech in the summer of 1954 and went into the service in July. Bob Hinds was also assigned to the Plants Division.

I received a card from Fred Brecher and he says, “Since I wrote last, I have asked a girl to marry me.” Well congratulations, Fred! I can’t quite read the spelling of the last name of the young lady so I’ll just call her Sandi. Sandi is from Dayton, Ohio. —VINSON W. BRONSON JR., *Secretary*, P.O. Box 409, Danbury, Conn.

• 1954 •

Dean Jacoby has sent me the information regarding our regional class secretaries. As you may know, these ‘officers’ have an unofficial but important function in reporting our class news. They will receive information regarding the 1954 graduates and will pass it on to either myself or Ed Eigel. For the New England area, Tom Gibbs, Apt. 6, 36 Gloucester Street, Boston 15, is handling information regarding those in the M.I.T. graduate school. The rest of the New England area is being handled by Bob Anslow, Harvard Business School, Chase E-34, Cambridge. Marilyn Leader, 249 Commonwealth Avenue, Boston, is handling information regarding those in the New York City area. New York state, Pennsylvania, and New Jersey are being covered by Stan Wolk, P.O. Box 78, Manorville, Pa. All of the East Coast, south of the Mason-Dixon line, has Chuck Masison, 1121 North Kensington, Arlington 5, Va. Moving out West, we have George Klein, 318 Circle Drive, Odessa, Texas, for the Southwest part of the country. At present, we are still in need of regional secretaries for the rest of the country. Anyone interested in handling this important function should contact me.

People are still being called into the army and air force. Will Fisk is more or

less marking time awaiting his call, and Bruce Backe is at Wright-Patterson. Alex Dreyfuss and Jack Murkland are in Germany with the Air Force, and John Flender is assigned to the Cambridge Research Center. Charlie Burnham, Larry Holmes, and Stewie Smith are all scheduled for Wright-Patterson on June 15. Wright-Patterson is mighty popular, as George Perry, Pete Stone, John Giancola are also there. Roy Reidinger is a member of the 1st Radiological Safety Support Unit, and is out in Nevada for sundry A-bomb tests. Ted Knowles and Eric Gillotte are at the Aberdeen Proving Grounds. The Navy O.C.S. has worked over several members of the Class. Bob Stewart is in Memphis training as an aviation maintenance officer. John Bradshaw has finished up at Newport, and Dick Nilson and Tom Henderson are still sweating it out. Dick married the former Jane Gruber last December in Boston.

Those who are still in civilian life include Tom Bastis, who is on the West Coast as a product development engineer with Kaiser. Pete Peterson is working for Goodyear Aircraft in Akron, Ohio, and Bill Beals is still in Oklahoma City. Charlie Masison is working for the National Security Agency and producing young blood on the side, namely one son, Richard Charles by name. George Klein is in Odessa, Texas, on Shell Oil’s training program, in which they hope to make a petroleum engineer out of a Course XV man. Jim Wolfe is working on a Ph.D. at the department of chemistry of the University of California. John Margulis is with Hamilton Standard in Windsor-Locks, Conn. Alfred Harper has joined the staff of the Arthur D. Little Company which is up Memorial Drive from M.I.T.

Among the army personnel of the Class of 1954 are Tom Bird, who is at Fort Belvoir, Va., and Locke Yut, who is stationed in Europe. Carl Schmid is in Uravan, Colo., working with the United States Vanadium Company. Jerry Perry is in Duncanville, Texas, with the air force, and is engaged to Shirley Hillard from Fort Worth. Lackland Air Force Base in San Antonio is entertaining Jay Fues, and Dick Walker is scheduled to join the party April 15. LeRoy Malouf is competing with Masison and Vogel by producing, with the assistance of wife Toni, a bouncing son, Frederick.

A few last minute reports. Marty Mills is at Carnegie Tech in mechanical engineering, and Al Milian is in chemistry at the University of California. Joe Pennimpede and Al Zappala are in Washington with the American Standards Association. George Schwenk is stationed in the Far East. Bob Lait is in Colorado with the Air Force, and Paul Koppel is in Fort McClellan, Va. Bill Coderre is in Stratford, Conn. Also down in San Antonio, Texas is Harry Taylor and his wife, the former Sandra Kane. Sam Losh is in Camden, N.J., with R.C.A. and is having quite a time comparing industry to education. He tells me that Paul Golden is also down there. For those of you who feel slighted at not finding yourselves in this column, send in little note about your doings to: DAVID R. WONES, *Acting Secretary*, 37 Bay State Road, Boston 15, Mass.

After TWO years of field-testing, here's the

NEW IMPROVED

TIREX

CORD

- *It's more flexible than ever before!*
- *It has greater pliability when cold!*
- *It's much easier and faster to machine-strip!*

New TIREX CORD retains its Selenium Neoprene Armor for added toughness.



New TIREX CORD is still cured in lead to make it smoother, denser and more uniform.

Simplex

TIREX

The New TIREX is the most supple, limber TIREX Cord ever made!

Find out more about the New TIREX CORD. Write to the address below for Folder 1022 today.

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.

New G-R[®] Automatic Sweep

The G-R Automatic Sweep, consisting of the Type 1750-A Sweep Drive and the Type 1263-A Amplitude-Regulating Power Supply, represents a new approach to simplify measurements by automation.

The Type 1750-A Sweep Drive attaches to any knob, dial or shaft for automatic sweeping of oscillators, generators and other equipment. Sweep Arc, Speed, and Center Frequency are all continuously variable, even while the Sweep is in motion, and large percentage variations in frequency are possible. The Type 1263-A Amplitude Regulator insures constant amplitude as frequency is varied.

Ever changing oscilloscopic patterns produced with the aid of this equipment depict the effects of circuit changes with unequalled clarity. Laboratory measurements which normally take hours by point-by-point methods now may be accomplished in minutes.

In combination with G-R Unit Oscillators which cover the complete frequency range from 0.5 to 2000 Mc, a versatile and inexpensive system of Sweeping Signal Sources is available. The Sweep Drive can be coupled to either the vernier control for sweeping over moderate ranges or connected directly to the main shaft to take advantage of the extremely wide frequency ranges of G-R Unit Oscillators.



Unique Type 1750-A Sweep Drive . . . \$400

Adapts Existing Manually-operated Equipment to Automatic Sweep Applications

There are three independent electrical circuits: The Speed Control and limit switch circuit for the motor; the CRO deflection circuit; and the blanking circuit which eliminates the return trace and produces a base line for oscilloscope display.

- ★ **Wide Range of Speeds**—0.5 to 5 cps reciprocating motion
- ★ **Sweep Arc**—adjustable from 30° to 300°—permits large fractional variations in frequency
- ★ **Universal Coupling System**—four adjustable spider-like arms readily attach to knobs and dials, 1" to 4" diameter and shafts 1/4" and 3/8"—shaft height also adjustable

- ★ **Completely Adjustable Center-Position Control**
- ★ **Rated Maximum Torque**—24 oz.-in.
- ★ **Limit Switch**—disconnects and brakes motor if pre-set limits of shaft travel are accidentally exceeded.
- ★ **CRO Sweep Voltage Supplied**—mechanically tied to movement of swept shaft, permitting oscillator calibration to be transferred to CRO screen.

NEW Type 1263-A Amplitude Regulating Power Supply . . . \$250

To get the full benefit from a sweep-type presentation, amplitude variation with frequency must be minimized. The new Type 1263 Regulating Power Supply has been especially developed for automatic-sweep applications and will hold output voltage constant to within 2%, independent of frequency.

This instrument is for use with Oscillators whose outputs can be controlled by varying plate voltage applied. D-C potential developed by an auxiliary rectifier at the oscillator output is compared with a d-c reference potential within the regulator—the correction applied to the oscillator plate supply minimizes the difference.

- ★ **Plate Voltage Supplied**—0-250 volts at 25 ma as required by oscillator to maintain pre-set output level (with 105-125 or 210-250 line volts)
- ★ **Heater Voltage Supplied**—6 volts d-c at 0.5 amperes at 115/230 volt line

- ★ **R-F Output Regulation Control**—permits r-f level to be set from 0.2 to 2 volts
- ★ **Response Time**—plate current changed at 3 ma per millisecond or faster
- ★ **Output Meter**—built-in d-c VTVM calibrated in r-f output

WE SELL DIRECT—Prices are net, FOB Cambridge or West Concord, Mass.

GENERAL RADIO Company

275 Massachusetts Avenue, Cambridge 39, Massachusetts, U.S.A.

90 West Street NEW YORK 6
8055 13th St., Silver Spring, Md. WASHINGTON, D.C.
920 S. Michigan Avenue CHICAGO 5
1000 N. Seward Street LOS ANGELES 38



1915-1955

40 Years of Pioneering

in Electronics